

## EFFECT OF INSTRUMENT ASSISTED SOFT TISSUE MOBILIZATION ON MECHANICAL NECK PAIN: A RANDOMIZED CONTROLLED TRIAL

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### ABSTRACT

**Background:** Mechanical cervical discomfort usually develops perniciously and is usually of several causes, one or more of which are: Poor posture, worry, melancholy, tension of the neck.

**Purpose:** To compare between the efficacy of instrument assisted soft tissue mobilization & traditional treatment on patients with mechanical neck pain.

**Methods:** 30 patients (male and female) were allocated randomly to 2 equal groups, ranging from 25 to 40 years of age. There are 15 patients in each group. Group (A) underwent traditional therapy with Garston technique. Traditional therapy was received by Group (B). They were evaluated pre and post treatment for neck pain severity by the visual analogue scale, activity daily living using neck disability index and range of motion using inclinometer.

**Results:** There were significant difference between instrument assisted soft tissue mobilization that was more effective than control group in relieving pain, functional disability and range of motion.

**Conclusion:** instrument assisted soft tissue mobilization has superior effect in relieving neck pain, functional disability and range of motion.

**Key words:** Instrument assisted soft tissue mobilization- traditional treatment -Mechanical neck pain – Inclinometer

### I. INTRODUCTION

Persons without a pathological aetiology of their symptoms with neck pain are usually deemed to have mechanical neck pain. Mechanical neck pain is seldom recognized as a direct pathoanatomic cause. Whereas neck pain can be caused by neurodegenerative disorder or pathologies revealed by radiography, tissue producing discomfort in the neck is much more commonly unidentified. <sup>(1)</sup>

reoccurrence frequency and chronic neck discomfort are considerable. Most people with neck pain have no complete symptomatic remission, with about 50-85% of patients who report neck discomfort 1-5 years later again. <sup>(2)</sup>

Instrument Assisted Soft Tissue Mobilization (IASTM) is a supplementary method which can support the implementation of numerous hand-operated therapies and eventually enhance of patient's sequel. <sup>(3)</sup>

Edges and points of the equipment (particularly smooth stainless steel) are driven through soft tissue as a stylus makes a recording gutter that provides densities, fibrosity, and tensile feedback. The subject has distinct feelings when touched by the tool, such as 'itching' or 'warming,' 'numbing' or 'crunchy,' or 'painful,' which are helpful to the

physician. This is particularly true when the capsules, tendons, ligaments and nervous sheathes that are hard to palpate with the human hand are palpable. (4)

The IASTM therapy is designed to promote the restart of connective tissues by resorbing extra fibroses, encouraging collagen secondary to fibroblast recruited healing. In turn this leads to scar tissues, adhesions, and fascial limitations being released and broken down. In laboratory investigations employing a mouse model, fibroblast growth and healing of collagen (i.e., production, orientation & maturity) have enhanced in cases of tendinitis generated by enzymes. (5)

Even though some of the procedures for the treatment of mechanistic neck pain were approved as ideal, there was not enough proof of conservative approaches like traction, actively or passively training, ultrasonic, TENS, patient coaching and non-steroids anti-inflammatory drugs is missing. (6). The simultaneous usage hand treatment and exercising in the cervicogenic headaches and mechanical neck pain are supported by increasing evidence. (7)

The use of hand treatments (e.g., mobilization, manipulations) and physical therapies (- for example, physiotherapies, exercising) for simple neck discomfort without a major neurological deficiency is based on evidence. In conjunction to exercising, manipulation and physical treatment can be used to manage the contemporary phase and to prevent potential neck discomfort to treat mechanical dysfunction. (8,9)

### Study design

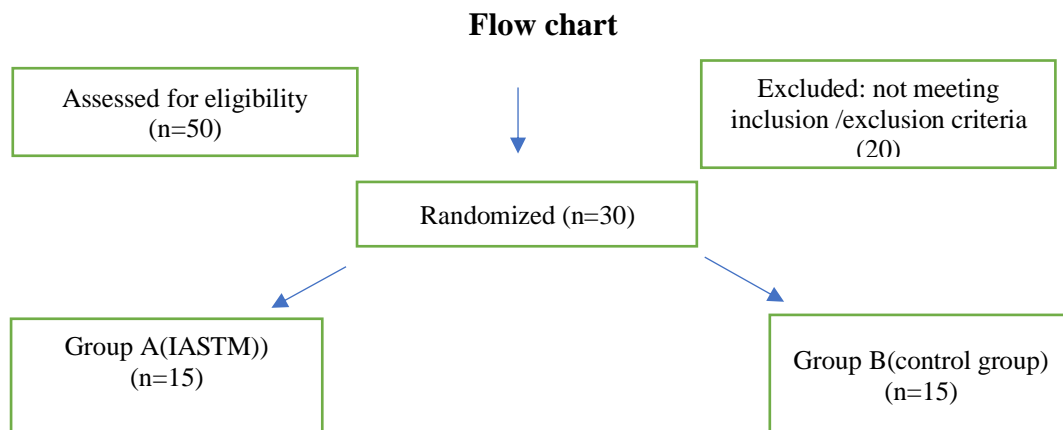
The research design was a randomly controlled pre-test post-test trail. The procedures followed agreed with the “Institutional Ethical Committee Clearance, and written informed consent was taken from the patients. Pan African Clinical Trial Registry number” was (PACTR202008747287742).

### participants

This research was conducted in Alshrouk hospital, during the period of December 2019 to March 2020 to assess the impact of instrument assisted soft tissue mobilization on mechanical neck pain.

### Randomization

Eligibility was evaluated for 50 individuals. As in flow chart (Fig. 1), 30 patients were randomized. Participants were allocated to two groups randomly. A computer randomization algorithm employed simple Randomization to place patients in two groups of equal numbers.



**Fig 1: Flow chart of the participants**

### Intervention

Thirty male and female patients with mechanical neck pain, their age was between 25 to 40 years, participated in this study. All patients were referred from an orthopedic physician who was responsible for diagnosis of cases based on clinical and radiological examination. They provided written informed consent to participate.

**Inclusion criteria:** Age between 25 and 40 years a history of chronic (for at least 3 months), they are diagnosed clinically mechanical neck pain without radiculopathy, spondylosis and disc prolapsed) of both sexes and have enough understanding to perform the tests.

**Exclusion criteria:** A history of infectious disease and systematic disorders such as diabetes, rheumatoid arthritis, hematological disease, sever cardiovascular diseases, Stroke patients, cancer patients& Blind and deaf patients.

They were randomly distributed into two equal groups. Patient in group A 15 subjects received GRASTON technique & conventional treatment includes (tens, hot packs, US & exercises). Group B 15 subjects received conventional treatment only.

### Evaluation Procedures

Each patient was assessed just pre and post treatment period. pain was assessed using the visual analogue scale (10)

### Neck Disability index

“This questionnaire has been designed to give information as to how neck pain has affected ability to manage everyday<sup>(11)</sup> and inclinometer to measure neck range of motion”. The Deluxe Inclinometer has a three-inch dial that provides readings to one degree.<sup>(12)</sup>

## II. TREATMENT PROCEDURES:

### Instrument assisted soft tissue mobilization

**Procedures:** all the patients informed all procedures before the start

**Group A:** 15 patients with mechanical neck pain received IASTM & conventional treatment. patient sitting on chair in comfortable position, apply lubricant material on treated area. Apply IASTM in 30-60 angle for 40 to 120 sec until hyperemia occur for each side, apply ice packs after treatment to decrease hyperemia<sup>(13)</sup>



### Group B:

#### Control group

15 subjects received conventional treatment only (hot packs, tens and U.S) plus proprioceptive exercises and isometric neck exercises. Treatment sessions were 3 times weekly for 4 weeks.

## III. RESULTS

The aim of study was to evaluate the instrument assisted soft tissue mobilization on mechanical neck pain. thirty patients aged from 25 to 40 years were participated in the study. Patients were randomly assigned into two equal groups. Data obtained from the two groups regarding visual analogue scale, neck disability index, and neck range of motion were calculated before starting the treatment and after the intervention for all groups. The measured variables were statistically analyzed and compared using “SPSS for windows version 25 (SPSS, Inc., Chicago, IL) with” Alpha level set at 0.05.

### Normality test:

“Data were screened for normality assumption, homogeneity of variance, and presence of extreme scores”. Shapiro-Wilk test for normality showed that the measured variables were normally distributed ( $p > 0.5$ ).

The baseline demographic characteristics of participants: -

The baseline demographic and clinical characteristics of subjects are shown in table 1. There were no statistically significant differences among the two groups regarding the age, weight, height, or BMI ( $p > 0.05$ ).

Table (1). Baseline Demographic Characteristics of Subjects(N=45) \*

Characteristics	Group A (n=15)	Group B (n=15)	F-Value	P Value
Age(years)	31.88±4.84	34.07±5.11	0.7	0.51
Weight(kg)	75.87±9.25	80.07±13.09	1.1	0,34
Height(m)	1.66±0.09	1.68±0.08	0,85	0,43
BMI (kg/m2)	27.2±4.13	28.00±5.28	1,09	0,35

BMI. Body mass Index; m, meter, Kg; kilogram; F, fisher test; p, probability value \* Data are mean± SD, P-Value < 0.05 indicate statistical significance.

“Mixed design multivariate analysis was conducted to assess the difference between participants in the two groups in the amount of change in their scores on the outcome measures”. Statistically Significant multivariate effects were found for the main effects of groups, Wilk's A = 0.18, F (16,70) = 5.99, P< 0.001, p2 = 0.58, for time, Wilk's A = 0.018, F (8,35) = 242.59, p < 0.001, p2 = 0.98, as well as for the interaction between groups and time, Wilk's A= 1.48, F (16,72) = 12.66, p < 0.001, p2 = 0.74.

#### Results of Mixed design analysis of Variance (ANOVA): -

Follow-up univariate ANOVAs reveal that significant change for VAS outcome variable, F(2,42) = 41.87, p< 0.001, p2 = 0.67, for NDI outcome variable, F(2,42) = 65.79, p< 0.001, p2 = 0.76, for flexion ROM outcome variable, F(2,42) = 108.76, p< 0.001, p2 = 0.84, for extension ROM, F(2,42) = 12.76, p< 0.001, p2 = 0.38, for right lateral flexion ROM outcome variable, F(2,42) = 6.51, p= 0.003, p2 = 0.24, and for left lateral flexion ROM outcome variable, F(2,42) = 9.42, p< 0.001, p2 = 0.31.

#### Within-group comparison:

There were statistically significant differences in all outcome measures (p< 0.05) between pre and post interventions in each group as in table 2.

Table (2): Comparison between pre and post interventions for all outcomes in each group

Measure	Groups	(I) time	(J) time	M D (I-J)	SE	Sig. <sup>b</sup>	95% CI <sup>b</sup>
VAS (mm)	IASTM	1	2	- 5.40*	0.226	0.0001	4.94, 5.86
	traditional	1	2	2.53*	.226	0.0001	2.08, 2.99
NDI	IASTM	1	2	18.93	.744	0.0001	17.43, 20.43
	traditional	1	2	4.53*	.744	0.0001	3.03, 6.03
Flex(deg).	IASTM	1	2	-32.00*	1.412	0.0001	-34.85, -29.15
	traditional	1	2	-2.33	1.412	0.11	-5.18, 0.52
Ext(deg).	IASTM	1	2	-12.00*	1.059	0.0001	-14.14, -9.86
	traditional	1	2	-3.67*	1.059	0.001	-5.80, -1.53
Rt Side Bending (deg)	IASTM	1	2	-13.33	.813	0.0001	-14.98, -11.69
	traditional	1	2	-5.67*	.813	0.0001	-7.31, -4.03
Lt Side Bending (deg)	IASTM	1	2	-13.67*	.888	0.0001	-15.46, -11.88
	traditional	1	2	-6.33*	.888	0.0001	-8.13, -4.541

#### IV. DISCUSSION:

The aim of study was to investigate the effect of instrument assisted soft tissue mobilization on mechanical neck pain

The present study was performed on thirty patients with mechanical neck pain. Their age ranged from twenty- five to forty years and they were divided into two equal groups. All the patients were assessed before and at the end of the study by visual analogue scale, neck disability index and ROM by inclinometer.

The results showed statistically significant differences among the two groups regarding pain, , neck disability index,

and neck range of motions outcome measures ( $P < 0.05$ ). instrument assisted soft tissue mobilization most effective than traditional treatment. These findings are in line with the findings of Kimetal; 2017 who found improved function post IASTM That lead to improvement in muscle activity level due to pain reduction. <sup>(14)</sup> This may result in better performance during daily activities and ultimately reduction of one's disability level. <sup>(15)</sup> Our study is also in line with Motimath et al., 2017 who conclude that the technique of IASTM using M2T blade is a useful tool in order to immediately decrease pain when subjects with upper trapezius spasm have tested the effects of the blade of M2T on people suffering from neck pain.

In addition our study comes in agreement with Motimath et al 2017 who concluded that IASTM technique by using M2T blade is a useful tool can decrease pain immediately in subjects with upper trapezius spasm they tested the effect of M2T blade on subjects with neck pain and they reported a decrease in discomfort and improved activity and noted that M2T blade can be applied for the softness of tight fascia with rhythmic strokes through the fascia until the bonds and crosslinks are broken and the release of fascia occurs. <sup>(16)</sup>

.in present research our choice to use IASTM was supported by the work of Hammer et al; 2008 & Baker et al 2015 they reported that enhancement in the Graston group is possible because to IASTM which enhances the expansion of soft tissues by correcting their limitations and <sup>(17,5)</sup> reduces the viscosity of tissues when heat is created from instruments friction and softens it. A reduction in the tissue viscosity physiologically enhances ROM <sup>(17)</sup>. Furthermore, Major alterations in ROMs resulting by IASTM can also be described through nervous system hypothesis. <sup>(18)</sup>

The benefit of the Graston approach over other soft tissue mobilization is that the metal surface of the tools, like the deep finger pads, does not compress tissues so that deeper limitations can be accessed. IASTM is a process that grows rapidly because of its efficiency and efficacy while still not being invasive <sup>(19)</sup> Concerning the results of IASTM group comes in agreement with study by Haritha P; 2015 who reported that improved function post IASTMA. The treatments which reduce pain may improve function of the neck, decrease in NDI scores may be attributed to decrease in pain. IASTM causes improvement in muscle activity level due to pain reduction. This may result in better performance during daily activities and ultimately reduction of one's disability level <sup>(15)</sup>

Snodgrass et al. 2003 reported that IASTM requires availability of instrument and training in its use. IASTM tool is an ergonomically designed tool which glides over adhered tissues and reverberates feeling in our hands, thus finding exact areas of restriction and help treat them. <sup>(20)</sup> It reduces imposed stress on hands of therapist. on the other hand, our study disagreement with a systematic review by Nazari et al 2019. whodon't encourage IASTM use in patients with no extremities or spinal disorders or with diversified pathology in enhance pain, function, or range of motion. <sup>(21)</sup> Although it has been identified that the Graston approach utilized in this study is more beneficial than active therapy, it does not statistically vary from other treatments. This is probably due to the comfortable position; Graston is a simple and convenient method <sup>(21)</sup>

The latest research trends encourage the combination of manual therapy with exercises Based on the research and existing patterns of practice, a cohort of persons with neck discomfort appears to be favourable for the combination of movement/manipulation, exercise, and perhaps traction procedure <sup>(22)</sup>.

Cleland and colleagues study in 2007, they found dramatic disability decrease in cervical radiculopathy patients following a conservative care plan that comprised intermittent cervical traction, manual treatment and muscle reinforcement of the deep neck flexor. While therapeutic exercises are important for treating chronic mechanical neck dysfunction, the relative effectiveness of specific exercises is not completely identified. <sup>(23)</sup>

Although mechanical neck pain prevalent, there exists a wide gap in the literature, which has not provided sufficient, solid data to favour one particular procedure compared to another in the conservation treatment of the pathology. This absence of clear proofs might largely attribute to the inconsistencies that exist now among therapists concerning treatment procedures. Actual research trends support the usage and exercise of manual therapy. Based on existing patterns of literature and practise. A group of people with neck pain seems to be involved in responding positively to a mix of mobility/manipulation, exercise and potentially traction procedures. <sup>(24)</sup>.

**Conclusion:** IASTM has a favorable effect than conventional treatment in reduction mechanical neck pain, improvement cervical range of motion & activity daily living.

**Concurrent interests:**

no financial assistance was received from our initiative by any institution or corporation and all costs have been insured. No conflicting interest

**Financing source:** self-financing.

**Appartment of the author:**

We are five authors of this work, and we all had to do this, no other scholars are participating in it.

**Acknowledgement:** No funding sources or sponsor involvement in design, collection, and analysis and interpretation, writing manuscript and submission of manuscript for publication.

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