Journal of Population Therapeutics & Clinical Pharmacology

Efficacy Comparison between the Strengthening Exercises and Transcutaneous electrical nerve stimulation (TENS) in Chronic Non-Specific Neck Pain patients

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ABSTRACT

Background: The mechanism of the underlying study was to choose the best treatment for the chronic non-specific neck pain but it is not clear nonspecific neck pain is associated with the deficit and alteration of the muscles proprioception that play role in the cervical joint position, motor control of the head, and postural stability. Countless treatments for the chronic non-specific neck pain which are approved by the many specialists which have good influence on the non-specific neck pain

Aim: The aim of our study is to analyze the difference in the between two treatments which treatment is best for the non-specific neck pain the relation between them produced by treatment based on the strengthening exercise which was provided by the theraband and TENS to stimulate muscles deeply and activate proprioception

Methodology: It was an experimental RTC study which was conducted in the OPD of Karachi. Age criteria 18-60, with non-specific chronic neck pain. The sample size of 24 subjects which are divided into two groups, group A group B comprising, the duration of the study is 4 months neck pain continue for at least the last 3 months. As depend on NDI the variables of the study we will take pain based on the visual Analog scale the findings will be analyzed statistically considering a % significance level p 0.333

Keyword: Tens, neck pain, cervical pain, pain, Theraband, isometric exercises

RESULTS: The TENS is more effective in non-specific neck pain than the strengthening exercise.

INTRODUCTION:

Adult impairment is primarily brought on by musculoskeletal conditions. The population's ageing is linked to a large portion of this disability load, as are behavioral risk factors and problems at work. Neck discomfort is the second most frequent cause of disability among musculoskeletal illnesses, after low back pain [1]. Neck discomfort is the most prevalent and painful musculoskeletal ailment, affecting 6% to 22% of senior people worldwide and rising to 38% in highincome nations. The degree of cervical range of motion

(ROM) limitation can really be linked to both the intensity of the pain and self-rated functionality. The fourth greatest cause of years spent with a disability is neck pain, which is one of the most serious health issues in the world. Non-specific neck pain prevalence increased with age and now affects 10% to 20% of the population annually. It typically affects females between the ages of 22 and 50 [2].

The trapezius muscle forms the posterior border of the posterior triangle, the sternocleidomastoid muscle the anterior border, and the clavicle the inferior border [5].

Neck pain

The perception of uneasiness in the neck region is termed as neck pain [9].

There are 2 types of neck pain. Specific and non-specific neck pain.

Non-specific neck pain

Nonspecific neck pain refers to the discomfort that doesn't indicates any pathological sign and symptoms. It alters with when the person overuse his muscles, different Physical activity, increases or decreases with time or improper posture. [1]

types of nonspecific neck pain

Neck pain can be characterized by whether or not it is in response to an injury, which is correlated with how long the pain might last. Typically, neck pain falls into one of the following two categories

Causes

Typically, it is impossible to pinpoint the exact reason of neck pain. Numerous variables frequently play a role in the emergence of generalized neck pain. Physical strain at work could involve doing tasks that are above your head or spending too much time seated at a desk without moving about. Emotional stress, such as concerns and anxiety about the family or the workplace, frequently plays a significant part.

The world still is unfamiliar with the causation of non-specific neck pain but it is interpreted that it could be somehow linked with linked with changes of the proprioception of the muscles of neck which works in the head control and cervical joint positioning. [3], physical tension and burden on working place, improper working conditions, poor ergonomics, sitting on an uncomfortable chair for a longer period of time without moving, looking above the straight eye view, above the head, emotional distress, , complications such as worries , anxieties about work, workload, job tension

help people go from having acute pain to having chronic pain.

In Pakistan

Another study carried out in Peshawar, Pakistan, discovered an alarmingly high prevalence of 84% neck pain. 7 In another study, 167 students were involved, and it was discovered that 70.1% of them had musculoskeletal pain. 8 Students are more likely to get neck pain since they spend so much time sitting and have an incorrect neck and trunk angle [16].

Treatment

Patients with non-specific neck pain have only been studied with certain drugs.

Non-narcotic analgesics, such as NSAIDs, provide stronger pain-relieving effects than a placebo, although there is only minimal evidence for their advantages over alternative treatments like manipulation (low level of evidence). The effectiveness of psychotropic drugs used as muscle relaxants is not well supported by evidence (poor level of evidence).

For persistent, non-specific neck pain, lidocaine injections into myofascial trigger points appear to be beneficial (low level of evidence).

Other therapies such injections or subcutaneous carbon dioxide insufflations (low level of evidence) and Botulinum toxin A (moderate level of evidence) failed to produce any clinical results.

Evidence of moderate quality suggests that trigger point acupuncture, in particular, can enhance pain alleviation for non-specific persistent neck

Description of the intervention

Since its invention in 1967, transcutaneous electrical nerve stimulation (TENS) has been the focus of clinical research. TENS is a noninvasive, transcutaneous method of producing analgesia through electrical stimulation. TENS is a lightweight, low-cost device that uses electrode pads to deliver gentle, pulsed

electrical currents across the skin surface to stimulate peripheral nerves. Different types of TENS can be used in clinical practice depending on the frequency (pulses per second), intensity (pulse amplitude), and pulse duration (periods when the electrical current is delivered) settings. You can set the TENS frequency to be high, low, or burst (bursts of highfrequency stimulation delivered at a much lower frequency). Depending on the patient's reaction, the electrical pulse's intensity can be adjusted to one of four levels: sub-sensory, sensory, motor, or noxious.

The 'gate control hypothesis of pain,' one of the ideas to explain the blocking of pain signals, served as the foundation for Shealy's developmental work on neuro-modulation techniques in the 1960s, from which the mechanism of action of TENS arose. According to this theory, TENS causes the activation of inhibitory interneurons in the Substantia Gelatinosa of the dorsal horn of the spinal cord by electrically stimulating large diameter fibers (A-beta fibers), which prevent nociceptive signals from small diameter fibers (Adelta and C) from being transmitted. The increase of endorphin release, which results in a vasodilatation in wounded tissue, is the other hypothesized

Stabilization exercises alone are helpful, as are stabilization exercises combined with dynamic or dynamic activities [21].

According to a study, the Semispinalis cervicis muscle can be relatively isolated with resisted isometric training at the level of the second cervical vertebra. The semispinalis cervicis muscle may therefore be stimulated by TENS: Transcutaneous electrical nerve stimulation (TENS) is a therapy that uses low voltage electrical current to provide pain relief. A TENS unit consists of a battery-powered device that delivers electrical impulses through electrodes placed on the surface of your skin. The electrodes are placed at or near nerves where the pain is located or at trigger points [25]

2) Isometric exercises: Isometric exercises are tightening (contractions) of a specific muscle or group of muscles. During isometric exercises, the muscle doesn't noticeably change length. The affected joint also doesn't move.

Isometric exercises help maintain strength. [26]

METHODOLOGY

STUDY DESIGN:

An Experimental Randomized controlled trial (RCT) STUDY SETTING:

The study was conducted at the OPDs of teaching hospital opds of Karachi hence this study was in a single setting.

SAMPLING TECHNIQUE:

· The subject was allocated to the group by random sample technique, after the approval of synopsis.

SAMPLING:

A sample of 24 subjects took who were divided into two groups (group A and group B) with each group comprising of12 subjects.

INCLUSION CRITERIA:

Male and Female patients

Age 18-60 years

Neck pain continued for at least the last 3 months from non-specific neck pain. Acute trauma of cervical or thoracic regions.

EXCLUSION CRITERIA:

Fractures of cervical or thoracic regions. Surgery of cervical or thoracic regions.

· History of neoplasm or malignancy.
· Cervical Radiculopathy.
· Inflammatory and any disc diseases
· Congenital abnormalities of the spine
· Vertigo or vestibular disorders.
· Diagnosed psychological disorder.
· Osteoporosis
· Whiplash syndrome
· Any signs and symptoms of nerve root compression.

DATA ANALYSIS

T-test was used for the contrast of intragroup hypotheses. i.e between baseline and follow values will be compared in both groups. [1] SPSS version 23.0 was applied for data analysis.

STUDY PARAMETERS

Demographics (name, age, gender, weight, height, mechanism of injury)
Visual analogue scale (VAS)
Neck disability index (NDI)

DATA COLLECTION PROCEDURE:

The study was collected at the And Rehabilitation. Randomization was done through MS Excel. The patient came after referred from OPD after an initial checkup. The study was purposive where all patients met the inclusion and exclusion criteria. An information sheet was given and explained the study objectives and procedures. The distribution order was covered until the participants were included and allocated to either group A or group B and different treatment was given. The outcome was obtained and analysed after the end of two sessions. Every attempt with in an ethical constant was made to obtain and record the outcome.

INTERVENTION:

Patients in both groups were assessed twice; at baseline and after an intervention .Patients were divided into two groups randomly: Group A and Group B. Each group has 12 patients.

GROUP A

The TENS was applied on the neck to group A, three times a week over 2weeks, per session of 15 minutes.
•Frequency: lOHz with 200-microsecond pulse
•Amplitude: 1mA

Figure 1theraband exercise

GROUP B

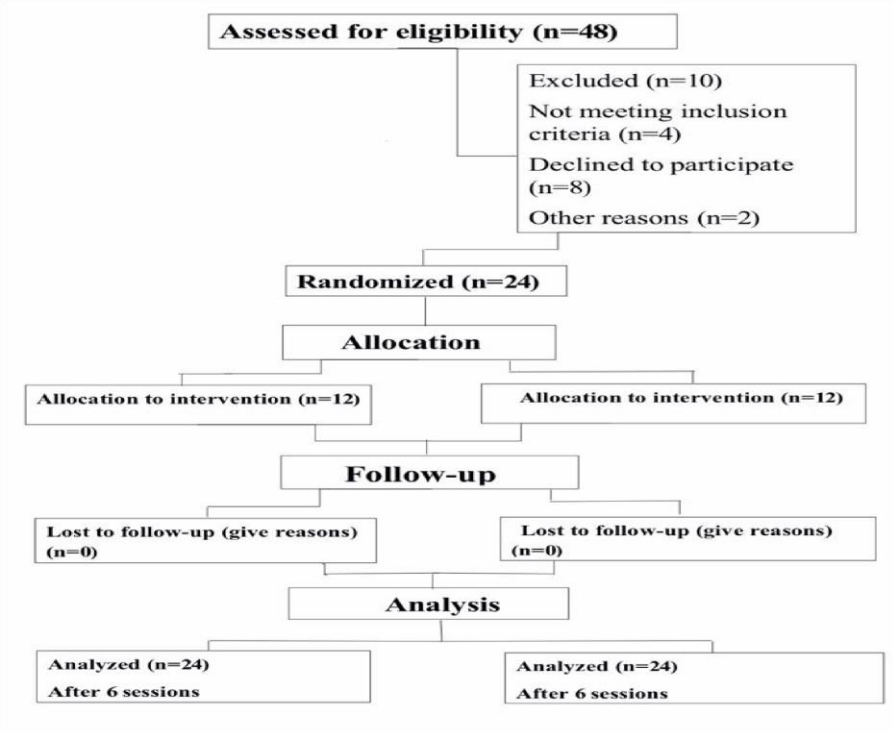
Group B was treated with strengthening exercise of the neck included

.Strength training isometric neck strength exercises performed in sitting position by Thera band .

.Duration: 3 times a week, 1set each day with 15 repetitions in each set over 2 weeks.

Figure 2: Placing TENS

In order to determine the intensity of the exercises for all participants, monitors the target number of repetitions (TNR) and the rate of perceived exertion (RPE) by OMNI -RES. The periodized training program lasted for 2 weeks, with 3 sessions per week,with a total of 20 repetitions performed at an intensity of 5 or "somewhat hard" OMNI-RES AM for the 1week of adaptation, and the next 2weeks at 7 or "hard" OMNI-RES AM. Warm-up and cool-down protocols (stretching) were designed and followed by both groups.



RESULTS:

Figure 1 shows the flow of subjects through the trial. Out of the 48 individuals, 24 fulfilled the criteria and were included in the study.

Table .1 and Table .2

Intragroup analysis of group A and group B did not show differences in VAS in any of the evaluations performed.

GROUP A (VAS)

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
VAS_Group_A_Pre_Assessment	12	1.500	.5222	1.0	2.0
VAS_Group_A_Post_Assessment	12	1.250	.4523	1.0	2.0

Ranks

		N	Mean Rank	Sum of Ranks
VAS_Group_A_Post_Assessment - VAS_Group_A_Pre_Assessment	Negative Ranks	4[a]	3.00	12.00
	Positive Ranks	1[b]	3.00	3.00
	Ties	7[c]		
	Total	12		

a. VAS_Group_A_Post_Assessment < VAS_Group_A_Pre_Assessment

b. VAS_Group_A_Post_Assessment > VAS_Group_A_Pre_Assessment

c. VAS_Group_A_Post_Assessment = VAS_Group_A_Pre_Assessment **Test Statistics[b]**

	VAS_Group_A_Post_Assessment - VAS_Group_A_Pre_Assessment
Z	-1.342[a]
Asymp. Sig. (2-tailed)	.180

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

TABLE .1

GROUP B (VAS)

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
VAS_Group_B_Pre_Assessement	12	2.083	.6686	1.0	4.0
VAS_Group_B_Post_Assessment	12	1.417	.5149	1.0	2.0

Ranks

		N	Mean Rank	Sum of Ranks
VAS_Group_B_Post_Assessment - VAS_Group_B_Pre_Assesseement	Negative Ranks	7[a]	4.00	28.00
	Positive Ranks	0[b]	.00	.00
	Ties	5[c]		
	Total	12		

a. VAS_Group_B_Post_Assessment < VAS_Group_B_Pre_Assessement
b. VAS_Group_B_Post_Assessment > VAS_Group_B_Pre_Assessement
c. VAS_Group_B_Post_Assessment = VAS_Group_B_Pre_Assessement

Test Statistics[b]

	VAS_Group_B_Post_Assessment - VAS_Group_B_Pre_Assessement
Z	-2.530[a]
Asymp. Sig. (2-tailed)	.011

a. Based on positive ranks.
b. Wilcoxon Signed Ranks Test

TABLE .2

Table .3 and Table .4

For NDI in the group B (p-value is 0.05), we observed that statistically significant differences were obtained throughout the treatment process However , there were no changes in the group A(p- value is 0.023)

GROUB A (NDI)

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
NDI_Group_A_Pre_Assessment	12	2.333	.7785	1.0	3.0
NDI_Group_A_Post_Assessment	12	1.667	.7785	1.0	3.0

Ranks

		N	Mean Rank	Sum of Ranks
NDI_Group_A_Post_Assessment - NDI_Group_A_Pre_Assessment	Negative Ranks	6[a]	3.50	21.00
	Positive Ranks	0[b]	.00	.00
	Ties	6[c]		
	Total	12		

a. NDI_Group_A_Post_Assessment < NDI_Group_A_Pre_Assessment
b. NDI_Group_A_Post_Assessment > NDI_Group_A_Pre_Assessment
c. NDI_Group_A_Post_Assessment = NDI_Group_A_Pre_Assessment

Test Statistics[b]

	NDI_Group_A_Post_Assessment - NDI_Group_A_Pre_Assessment
Z	-2.271[a]
Asymp. Sig. (2-tailed)	.023

a. Based on positive ranks.
b. Wilcoxon Signed Ranks Test

TABLE .3

GROUP B (NDI)
Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
NDI_Goup_B_Pre_Assessement	12	2.583	.6686	2.0	4.0
NDI_Group_B_Post_Assessement	12	1.667	.7785	1.0	3.0

Ranks

		N	Mean Rank	Sum of Ranks
NDI_Group_B_Post_Assessment - NDI_Goup_B_Pre_Assessement	Negative Ranks	9[a]	5.00	45.00
	Positive Ranks	0[b]	.00	.00
	Ties	3[c]		
	Total	12		

a. NDI_Group_B_Post_Assessement < NDI_Goup_B_Pre_Assessement

b. NDI_Group_B_Post_Assessement > NDI_Goup_B_Pre_Assessement
c. NDI_Group_B_Post_Assessement = NDI_Goup_B_Pre_Assessement

Test Statistics[b]

	NDI_Group_B_Post_Assessement - NDI_Goup_B_Pre_Assessement
Z	-2.810[a]
Asymp. Sig. (2-tailed)	.005

a. Based on positive ranks.
b. Wilcoxon Signed Ranks Test

TABLE .4

After completing the complete treatment, we obtained statistically significant results only for the groupB (NDI).

Table .5

If we compare the results between group A and group B using VAS statistical analysis show significant differences between the experimental groups .Group A participants treated with TENS shows greater results compare to group B participants treated with theraband. The p-value is 0.333.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
SEVERITY_VAS_1 * GROUP	24	100.0%	0	.0%	24	100.0%

SEVERITY_VAS_1 * GROUP Crosstabulation

Count				
		GROUP		
		groupA	groupB	Total
SEVERITY_VAS_1	1-3 mild pain	9	7	16
	4-6 moderate pain	3	5	8
Total		12	12	24

Chi-Square Tests

	Value	Df	Asymp. Sig. (2sided)	Exact Sig. (2sided)	Exact Sig. (1sided)
Pearson Chi-Square	.750[a]	1	.386		
Continuity Correction[b]	.188	1	.665		
Likelihood Ratio	.756	1	.385	.667	
Fisher's Exact Test					.333
Linear-by-Linear Association	.719	1	.397		
N of Valid Cases[b]	24				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 4.00.

b. Computed only for a 2x2 table

TABLE .5

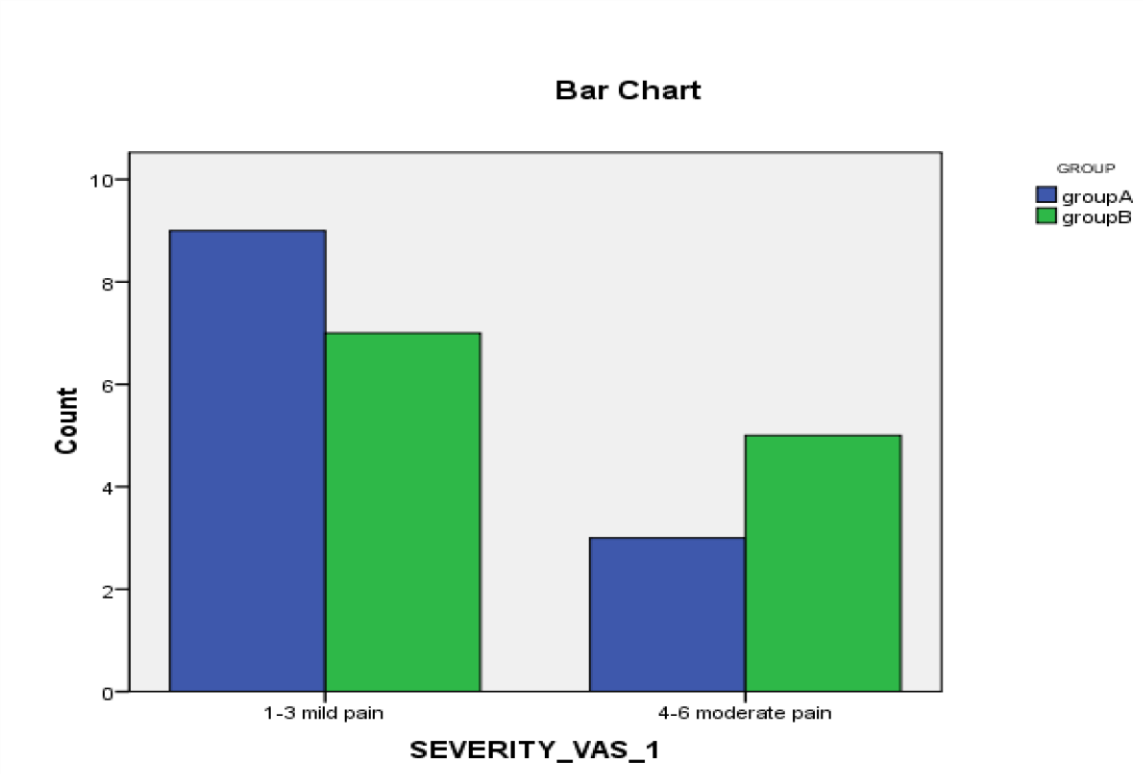


TABLE .6

If we compare the results between group A and group B using NDI statistical analysis show significant differences between the experimental groups .Group A participants treated with TENS shows greater results compare to group B participants treated with theraband. The p-value is 0.827

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
SEVERITY_NDI_1 * GROUP	24	100.0%	0	.0%	24	100.0%

SEVERITY_NDI_1 * GROUP Crosstabulation

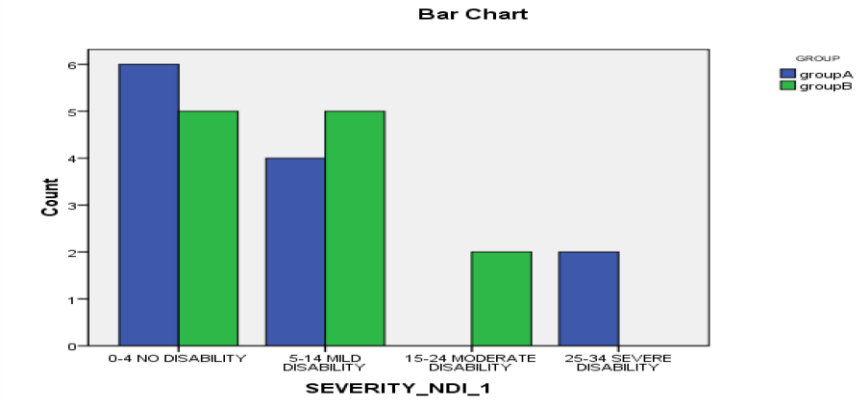
Count		GROUP		
		groupA	groupB	Total
SEVERITY_NDI_1	0-4 NO DISABILITY	6	5	11
	5-14 MILD DISABILITY	4	5	9
	15-24 MODERATE DISABILITY	0	2	2
	25-34 SEVERE DISABILITY	2	0	2
	Total	12	12	24

Chi-Square Tests

	Value	df	Asymp. Sig. (2sided)
Pearson Chi-Square	4.202[a]	3	.240
Likelihood Ratio	5.748	3	.125
Linear-by-Linear Association	.048	1	.827
N of Valid Cases	24		

a. 6 cells (75.0%) have expected count less than 5. The minimum expected count is 1.00.

TABLE .6



DISCUSSION:

The aim of this study was to compare the two treatment which was based on strengthening exercise with theraband and modalities with transcutaneous
Electrical nerve stimulation which is more effective in non-specific neck pain
To find out the best treatment protocol for non-specific neck pain randomly Twenty four participated male and female with non-specific neck pain which is further divided in two groups Group A and Group B to compare two treatment which treatment was more effective in non-specific neck pain further it is based on the pre And post assessment to compare the both result after the completion of the six sections of the treatment Group A was treated by the tense and Group B was treated by the theraband. After the post assessment of the both groups
we find that result transcutaneous electrical nerve stimulation is more affective it stimulates the muscles deeply after the six section of treatment patient pain reduced and patient discomfort at night due to pain is reduce and those patient we provide theraband strengthening exercise it doesn't stimulates the muscles deeply they still have mild pain in neck

Lars L Andersen et al. Arthritis Rheum 2008 conducted a study on the Effect of two contrasting types of physical exercise on chronic neck muscle pain. It was a randomized controlled trial and recruited subjects from 7 work place were recruited characterized by monous jobs e.g computer intensive work forty eight employed women with chronic neck muscles pain defined as a clinical diagnosis of trapezius myalgia randomly assigned to 10 weeks of specific strength training locally for affected muscles, general fitness training performed as leg bicycling with relaxed shoulder, intervention without physical activity .The main outcome measure was an acute and prolonged change in the intensity of neck muscle pain 100 mm visual Analog scale VAS Results. A decrease of 35 mm (approximately 79% P<o.oo1 in the worst VAS pain score over a 10 weeks period was seen with specific strength training , where as an acute and transient decrease in pain 5 mm, P<0.05 was found with general fitness training…
Ken Fredin et al. musculoskeletal Sci Pract.2017 Oct. A systemic review search on EMBASE, MEDLINE, AMED, CENTRAL and PEDRO were
performed until June 2017. Randomized controlled trials with adult grade 111 neck pain patients we included if they investigated the combined effect of MT and ET to the same ET or MT alone ,and reported pain intensity or disability on numerical scales quality of the included trials was assessed with the Pedro scale, and the quality of evidence was assessed with grades
Results: .1169 articles were screened and 7 studies were included, all of which investigated the addition of ET to MT. Only very small and non-significant between groups differences was found on pain intensity at rest neck disability, and quality of life at immediate post treatment, 6 months, and 12 months follow-up. The quality of evidence was moderate too low for neck disability and quality of life out comes.

CONCLUSION

TENS is more effective than strengthening exercise with theraband, in our study TENS is effective for long term in non-specific neck pain it gives deep stimulation and relax the muscles and reduce the neck pain and night discomfort due to more effective than strengthening exercise with theraband **REFERENCES**
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