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A Comparative Study on the Adequacy of Transcutaneous Electrical Nerve Stimulation and Traction Devices in Patients with Cervical Spondylosis.

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ABSTRACT

This paper was planned to assess and compare the adequacy of transcutaneous electrical nerve incitement (TENS) and footing gadget in quiet with cervical spondylosis for diminishes torment concentrated and Increments run of movement cervical spondylosis. Strategies: Six of females' members with neck torment was arbitrarily apportioned to two bunches, treated with either TENS (n = 6) or fake treatment (n = 6). These patients were chosen from the outpatient of Tripoli therapeutic center healing center in Tripoli. Patients were isolated arbitrarily by basically strategy into break even with group's number. Bunch A - comprise of 3 subjects with cervical spondylosis who will be given restorative cervical footing and physical treatment program (Manual rub, Works out) for 3 sessions – weeks for 4weeks.Group B - comprise of 3 subjects with cervical spondylosis who will be given restorative transcutaneous electrical nerve incitement (TENS) and physical treatment program (Manual knead, Works out) for 3 sessions – weeks for 4 weeks. Gather A and Gather B subjects will be compared to know which treatment is more successful. **Results**: The evaluations were compared and utilized to degree result treatment. Advancement in their condition was measured in terms of a lessening within the individual's level of torment amid the week after the conclusion of the primary session there was a significant difference between before and after treatment for left ROM because the mean value of pre-treatment was (40) and post-treatment was (43.3) where the percentage improvement was (96, 29%). There was a significant difference between before and after treatment for right ROM rotation because the mean value of pre-treatment was (43.3) and post-treatment was (70) where the percentage improvement was (95, 83%). **Conclusions**: Within the limitations of the study, the following conclusion was that adding TENS therapy to a physical therapy program (manual massage, exercise) would be more effective in managing symptoms of osteoarthritis. Cervical vertebrae, relieve neck and arm pain, reduce neck crippling, and improve equipment traction of activities of daily life.

1. INTRODUCTION

Spondylosis is characterized as an incendiary preparation happening basically because of disk degeneration around the a mphiarthrodial joint shaped by connecting vertebral bodies and the disk between them. Disk degeneration and advancem ent of spondylosis are portions of the ordinary maturing handle. Around 95% of individuals by age 65 have cervical s pondylosis to a few degrees.

The degeneration can inevitably compound and cause either compression of leaving cervical spinal nerves or of the cerv ical spinal cord.(SR, 2000), Cervical spondylosis presents itself in three symptomatic shapes neck Torment, cervical r adiculopathy, and cervical myelopathy. Neck torment and cervical radiculopathy (nerve root inclusion) can be intense, s ub-acute, or unremitting conditions. Cervical myelopathy is less visited within the spondylitis understanding and happen s in more seasoned patients with indications such as neck, subscapular, or bear torment, caused by shock sensations and deadness within the limits. Cervical myelopathy includes engine and reflex changes demonstrative of a more unremittin g condition and can in the long run result in spastic shortcoming and deadness of the limits, misfortune of adroitness, sp astic walk, dorsal column work misfortune, and difficult bracket. These unremitting indications can inevitably have gott en to be lasting with the destitute forecast. (Shedid, 2007), There are different treatment alternatives utilized to treat nec k torment, for case, warm, rub, control, cervical footing and supply of a cervical collar due to musculoskeletal disarrang es. Among them, transcutaneous electrical nerve incitement (TENS) is broadly accessible in Western constant torment cl inics. Subjects may encounter a little help from torment from these modalities but this advancement is seldom supported , since subjects as often as possible return to the doctors without the issue illuminated. There would hence show up to be a requirement for a implies of controlling incessant neck torment (Barlas P &Ting SLH, 2006). TENS could be a basic, n oninvasive methodology in physiotherapy that's commonly utilized to control both intense and inveterate torment emerg ing from a few conditions. It was presented into clinical hone in 1972 as an aide to other torment treatments. The compo nent of the activity of TENS is still not caught on. The absence of pain may be delivered by the tweak of nociceptive inp ut in the dorsal horn of the spinal cord by peripheral electrical incitement of expansive tactile afferent nerves. This can b e the 'gate control theory' of torment. On the other hand, electrical incitement of certain receptor destinations within the dorsal horn of the spinal line may discharge endorphin, in turn, creating an absence of pain that can be turned around by naloxone (Johnson M. 2002). A few things about inspecting the adequacy of TENS in musculoskeletal disarranges have been distributed. Since the 1970s, TENS has been picked up ubiquity and utilized as a treatment of intense and persisten t torment (Osiri M &Welch V, 2004) transcutaneous electrical nerve incitement now is one of the foremost commonly ut ilized shapes of electro absence of pain. In medicine, TENS is the foremost habitually utilized electrotherapy for creatin g torment help (Itoh K &Itoh S, Katsumi Y, 2009). Many clinical ponders exist concerning the utilisation of TENS for di fferent sorts of disarranges such as moo back torment, Myofascial and joint torment, thoughtfully interceded torment, bl adder incontinence, neurogenic torment, visceral torment, postsurgical torment, constant musculoskeletal pain. The chie f advantage is that it may be a non-invasive and nontoxic frame of torment administration, which is based, in portion, on the Door Control Hypothesis of torment. It is thought to enact the huge distance across, myelinated A-beta strands which have a moo limit for electrical incitement (Johnson M. 2002), (Osiri M &Welch V, 2004). The major hazard figure that c ontributes to the onset of cervical spondylosis is maturing. A few intense and inveterate indications can happen, that beg in with neck torment and may advance into cervical radiculopathy. It is exceptionally common in individuals over 50 a l ong time of age and those who have a history of injury and who ought to do work like writing or people who need to kee p their neck in one position as in perusing, composing and other table works. The locale of torment depends on the locat ion where the cervical spine is influenced by the pathology in upper cervical spine-headache, mid-cervical spine-neck to rment and Region from C4 toT2- transmitting torment in bear and arm either one-sided or two-sided. (TENS) could be a commonly utilized non-pharmacologic and noninvasive treatment for torment. The utilize of electric current created by a gadget to fortify the nerves for restorative purposes. The unit is more often than not associated with the skin utilizing tw o or more anodes (Robinson &Mackler, 2007). Cervical footing treatment alludes to any therapeutic strategy that applies drive along the inferior-superior hub of the spine to expand the cervical spine vertebrae. Its reason is frequently to rectif y the back, to calm weight on the spine and to extend the bloodstream to the harmed region. For decades, footing treatm ent has been broadly utilized in nonsurgical treatments and recovery to treat persistent neck torment caused by herniated circles and other wounds at the cervical spine region (Savva C, 2013). The Cervical Spine Neck is a portion of a long ad aptable column, known as the spinal column or spine, which amplifies through most of the body. It is composed of verte brae that start within the upper middle and conclude at the base of the cranium. The neck backs the weight of the head a nd ensures the nerves that carry tangible and engine data from the brain down to the rest of the body. In expansion, the n eck is exceedingly adaptable and permits the head to turn and flex in all headings. (Dr Edward Crowther, 2010), (figure1).

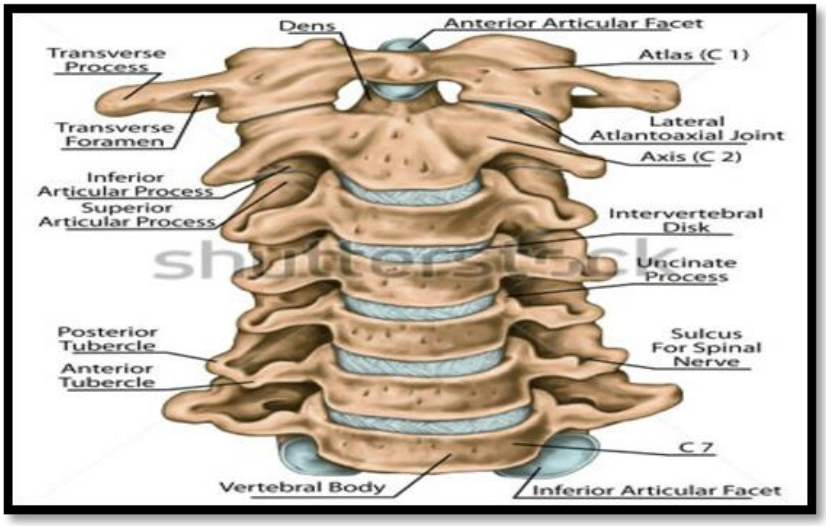

Figure 1- The bones of the cervical spine.

Numerous therapies are available to address neck discomfort, including cervical traction, heat therapy, manipulation, massage, and cervical collars for musculoskeletal conditions. Transcutaneous electrical nerve stimulation is one of Western chronic pain clinics' most widely utilised therapies (TENS) therapies. While some pain relief may be obtained with these therapies, it is usually just brief, and patients typically return to doctors with the same issue. Thus, a more potent method of managing persistent neck discomfort is required. TENS is a popular non-invasive physiotherapy technique for managing both acute and chronic pain from a range of illnesses. It was initially made available in 1972 as a supplement to conventional painkillers. TENS's mode of operation still needs to be better understood. According to the "gate control theory" of pain, analgesia may be brought on by peripheral electrical stimulation of big sensory afferent neurons, which modifies nociceptive information in the spinal cord's dorsal horn. On the other hand, endorphins, which cause analgesia that may be counteracted by naloxone, may be released by electrical stimulation of certain receptor sites in the spinal cord's dorsal horn (Johnson M. 2002).

2. METHOD

Subjects

Outpatients with neck pain were recruited from the Applied Health Sciences Physiotherapy Laboratory of Jordan Univ ersity of Science and Technology. Subjects were clinically and radiologically diagnosed with neck pain due to a muscul oskeletal disorder. Other inclusion criteria for the study were ages 20 to 75, and neck pain that persisted most days of th e past month. Subjects received no treatment for neck pain other than oral analgesics for one week after the end of the fi rst course of treatment. In addition, the subject received no prior TENS treatment.

Patients were excluded if they had any of the following: with pacemakers, as TENS electromagnetic pulses can inhibit activity; have a history of malignancy, which may be the cause of the current bone pain. On arrival at the ward, the stud y was explained to eligible subjects with neck pain and written informed consent was obtained and allowed to participat e in individual subjects. According to the block randomization table (generated by sample size 2.0 Int), registered subjec ts were allocated to either the TENS group or the placebo group. This study was conducted to investigate The effect of T ENS and traction devices in patients with cervical spondylosis for reducing pain intensity, and increased range of motio n and comparison of the outcomes of the 2 groups.

Study Duration:

An experimental study was conducted at the outpatient Tripoli Medical Centre Hospital in Tripoli, Libya between Oct ober 2017 and January 2018. The study involved six female patients who were selected from the hospital's outpatient department.

The patients were divided randomly into two groups of three each. Group A consisted of subjects with cervical spond ylosis who received therapeutic cervical traction and a physical therapy program (manual massage and exercises) for t hree sessions per week over four weeks. Group B consisted of subjects with cervical spondylosis who received therap eutic transcutaneous electrical nerve stimulation (TENS) and a physical therapy program (manual massage and exerci ses) for three sessions per week over four weeks. The study aimed to compare the effectiveness of the two treatments.

Instrument for treatment:

- Transcutaneous electrical nerve stimulation (TENS).
- Traction.

Tools of study:

Jell, oil, gloves, Libra, scale length. Sheets.

Procedure:

The pain intensity level was measured by visual analogue scale (VAS) and the range of motion of cervical Spain wa s measured by Goniometer. All these variables were measured during pretreatment and after 6 weeks of treatment in b oth groups. The measurements were taken and recorded.

Instrument for evaluation:

Range of Motion: Range of motion (ROM) is a description of how much movement exists at a joint. The most com mon way is by using a double-armed goniometer. (Luttgens,1997).

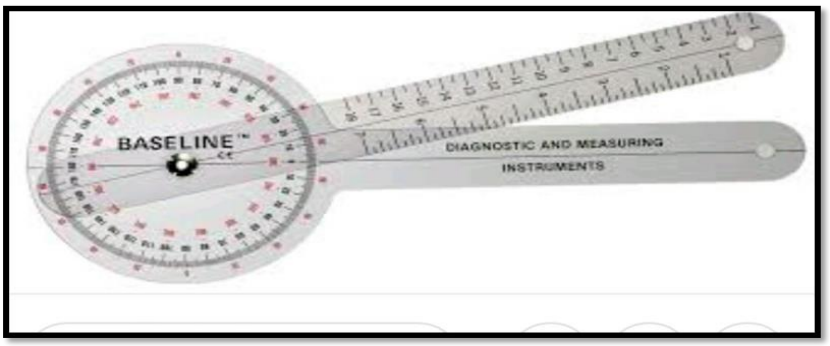

Figure 2- double-armed goniometer.

- **Visual analogue Scale:**

The Visual Analog Scale (VAS) is a tool used to measure the intensity level of pain. It consists of a 10cm line with two points at either end representing 'no pain' and 'pain as bad as it could be'. Patients are asked to mark the line corre sponding to their current level of pain. The distance measured from the 'no pain' marker to the marked point on the lin e gives a pain score out of 10. This method was first introduced by Scott in 1976.ore out of 10. This method was first introduced by Scott in 1976.

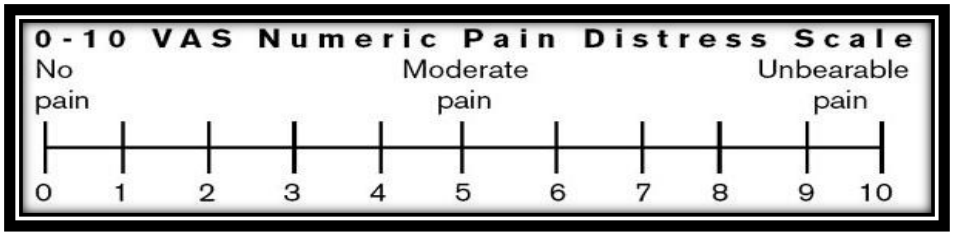

Figure 3 - visual analogue Scale

Instrument for treatment:

- Transcutaneous electrical nerve stimulation (TENS
- Traction:

Figure 4- Transcutaneous electrical nerve stimulation (TENS). **Figure 5-traction device**

Treatment procedure:

- **Selected physical therapy program:**
  - **Manual massage:**

The Application of an accurately determined and specifically directed manual force to the body, in order to improve mobility in areas that are restricted; in joints, in connective tissues or in skeletal muscles.

Figure 6- Application Manual massage

- **Exercises:**

1- Static stretching: - Are held for a predetermined length of time and can be classed as maintenance or developmental. Maintenance stretches are held for 10 to 20 seconds.

Figure 7 -static stretching **Figure8- Rotation of the neck**

2- Strengthening exercises: -

Isometric Neck Exercises apply enough resistance with hands without head move and hold for at least 5 seconds per exercise.

Mechanical Traction:

Applied 7% of the body weight for 10 min. The program has been applied to the patients for 3 weeks. The Physiotherap y treatment were given three sessions per week.

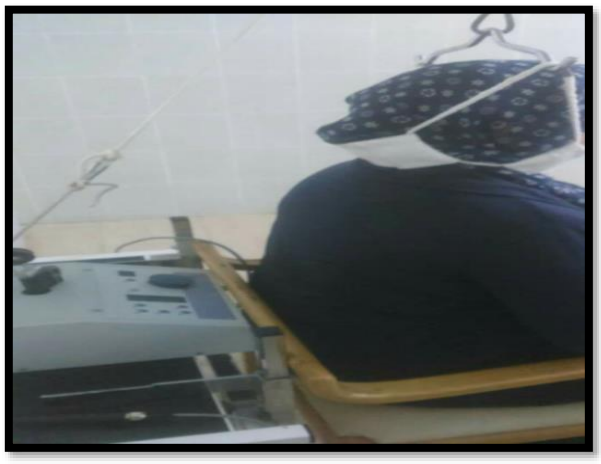

Figure 9- Application mechanical traction

Figure 10 -Application of TENS

TENS therapy:

TENS current was delivered by means of two carbon electrodes one electrode Para vertebral on the main pain spot, the o ther electrode laterally reversed on the opposite side in the irradiating pain area with parameters of (pulse width Frequen cy: 5Hz Intensity: high Pulse duration: 300 Micro sec. Duration: 20 minutes, 3 sessions/week over upper trapezium muscle.

Data analysis:

The following statistical procedure was performed as the following descriptive statistic including mean and percentage difference after treatment and data compared with before treatment.

3. RESULT

General characteristics of the subjects:

In this study, the women of 6 cervical spondylosis patients were divided into two equal groups. Pain intensity and range of motion from the cervical reading for each patient were recorded and tabulated in the measurement instrument (table 1).

Table 1: General characteristics of patients in both groups (A and B*)*

Cases information					
Group A	**patients**	**Height**	**Age**	**Sex**	**Weight**
	Patient 1	1.67	48	Female	95
	Patient 2	1.60	52	Female	67
	Patient 3	1.70	48	Female	85
Group B	Patient 1	1.70	52	Female	82
	Patient 2	1.65	47	Female	67
	Patient 3	1.59	61	Female	79

- **Pain intensity**

Table 2- Shows pretest and posttest pain scales for (group A)

Pain level intensity		
characteristics	**Pre treatment**	**Post treatment**
Patient 1	8	1
Patient 2	8	2
Patient 3	9	2
Mean	8.3	2
Percentage	83.33%	16.66%

The figure below represents the values and scores that have been analyzed in diagrams showing the difference between the values pain intensity pre and post treatment.

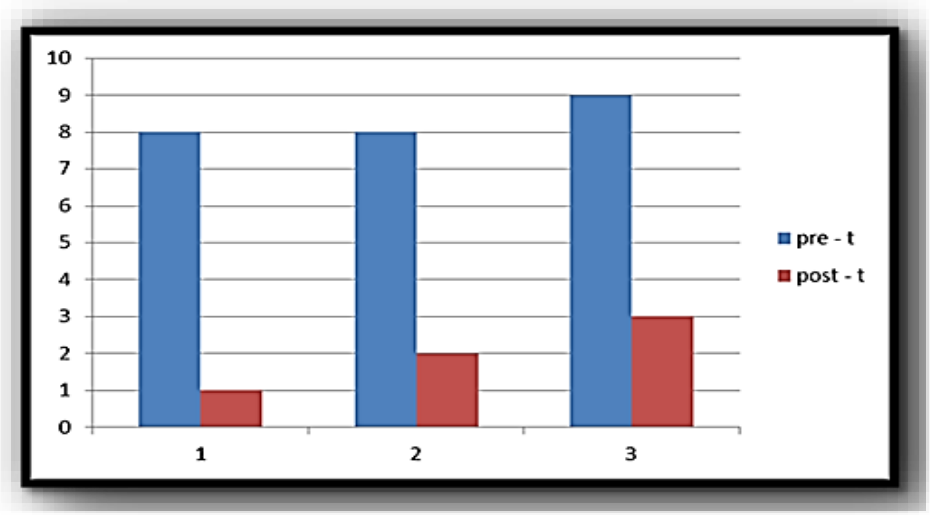

Figure 2: The difference between pre and post pain scale for (group A)

- **Flexion and Extension of cervical:**

Table 3- Shows pre-test and post-test pain flexion and extension for (group A)

Flexion and Extension of cervical				
Characteristics	**Pre treatment**		**Post treatment**	
ROM	**Flexion**	**Extension**	**Flexion**	**Extension**
Patient 1	40	20	40	40
Patient2	45	20	45	40
Patient 3	15	45	45	45
Mean	33.3	28.3	43.3	41.6
Percentage	74%	62.9%	96%	92.5%

The figure below represents the values and scores analyzed in the diagram showing the difference between the Cervical and Enlarged values before and after the treatment.

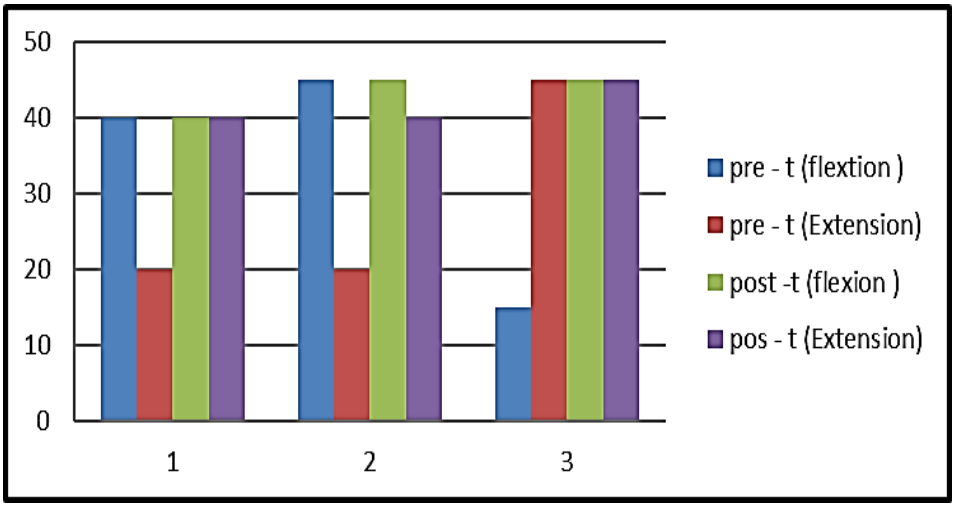

Figure 3: The difference between pre and post flexion and extension for (group A)

- **ROM. Lateral Flexion for right and left side:**

Table 4- Shows pre-test and post-test ROM lateral flexion for right and left Side for (group A)

Lateral Flexion				
Characteristics	**Pre treatment**		**Post treatment**	
ROM	right	left	right	Left
Patient 1	20	40	40	45
Patient 2	20	40	40	45
Patient 3	30	45	45	45
Mean	23.3	41.6	41.6	45
Percentage	51.85%	92.59%	92.59%	100%

The figures below represent the values and scores that have been analyzed in diagrams showing the difference between the values Lateral Flexion (R and L) of cervical pre and post treatment.

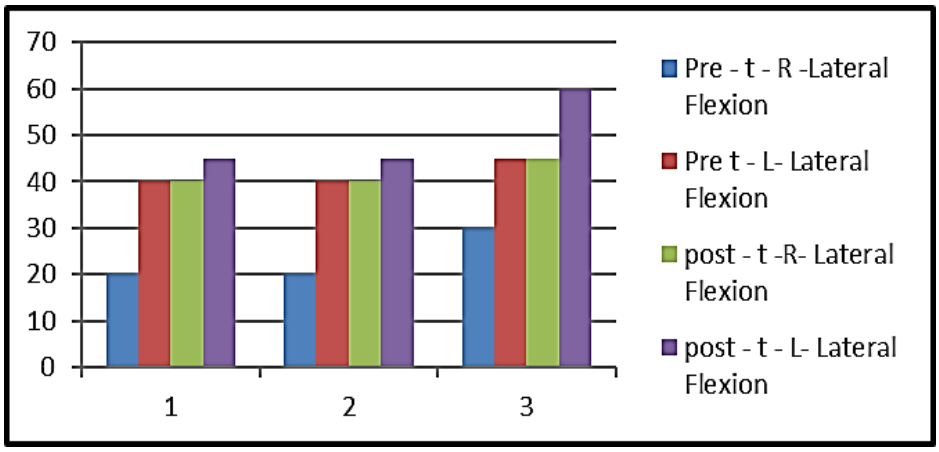

Figure 4: The difference between pre and post ROM lateral flexion for right and left side for (group A).

- **ROM Rotation right and left side:**

Table 5- Shows pre-test and post-test ROM rotation right and left side for (Group A)

ROM Rotation				
characteristics	**Pre treatment**		**Post treatment**	
ROM	right	left	Right	Left
Patient 1	40	70	65	80
Patient 2	40	70	70	70
Patient 3	40	60	60	70
Mean	40	66.6	65	73.3
percentage	50%	83.33%	81.25%	91.66%

The figure below represents the values and scores that have been analyzed in diagrams showing the difference between the values ROM Rotation R and L of cervical pre and post treatment.

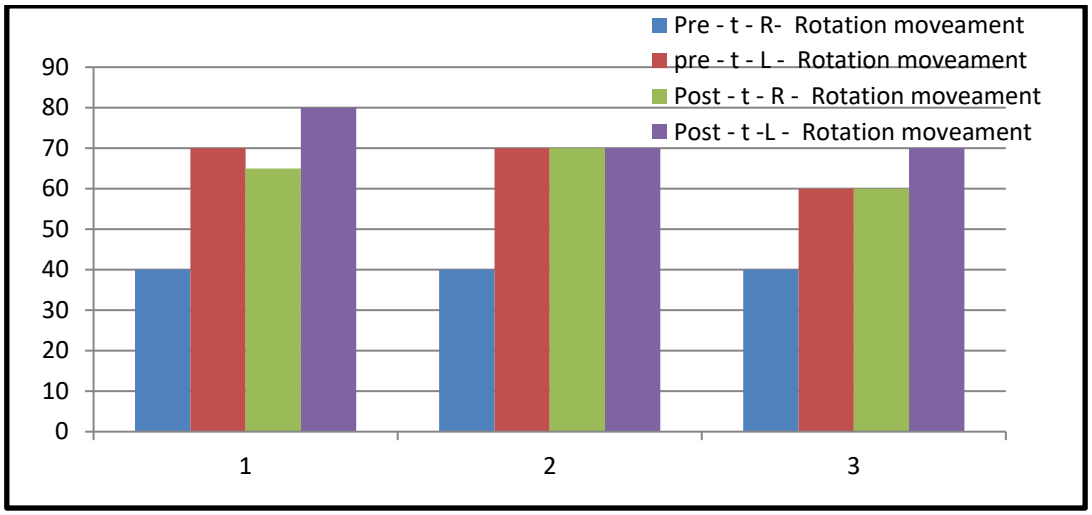

Figure 5: The difference between pre and post ROM lateral flexion for right and left side for (group A).

In this research, there was a noteworthy distinction between some time recently and after treatment in torment concentrated since the cruel esteem of pre-treatment was and post-treatment (Binder AI, 2007) where the rate advancement was (16.66) %). There was a noteworthy contrast between pre-and post-treatment for flexion as the cruel of pre-treatment and post-treatment where the rate change was (96). %). In terms of examination, there was a noteworthy distinction between some time recently and after treatment to grow since the cruel esteem of pre-treatment (Binder Pet.al., 2000) and post-treatment where the rate enhancement is (92.5%). There was a noteworthy contrast between some time recently and after treatment for right ROM since the cruel esteem of pre-treatment and post-treatment where the rate advancement was (92.59%). Agreeing with the factual investigation, there was a noteworthy distinction between some time recently and after treatment for cleared out ROM since the cruel esteem of pre-treatment and post-treatment where the rate enhancement is (100 %). There was a critical distinction between some times recently and after treatment for right ROM turn since the cruel esteem of pretreatment was (40) and post-treatment where the rate advancement was (81.25%). There's a critical distinction between preprocessing and post-preparing for cleared-out ROM revolution since the cruel for preprocessing is (66.6) and for post-handling is (73.3) where the rate enhancement was (91.66%). (Garfin SR, 2000).

4-3-Data analysis (Group B) TENS:

- **pain intensity**

Table 6- Shows pre-test and post-test pain scales for (group B)

Pain level intensity		
characteristics	**Pre treatment**	**Post treatment**
Patient 1	9	2
Patient 2	9	2
Patient 3	4	0
Mean	7.33	1.33
percentage	73.33%	13.3%

The figures below represent the values and scores that have been analyzed in diagrams showing the difference between the values pain intensity pre and post treatment.

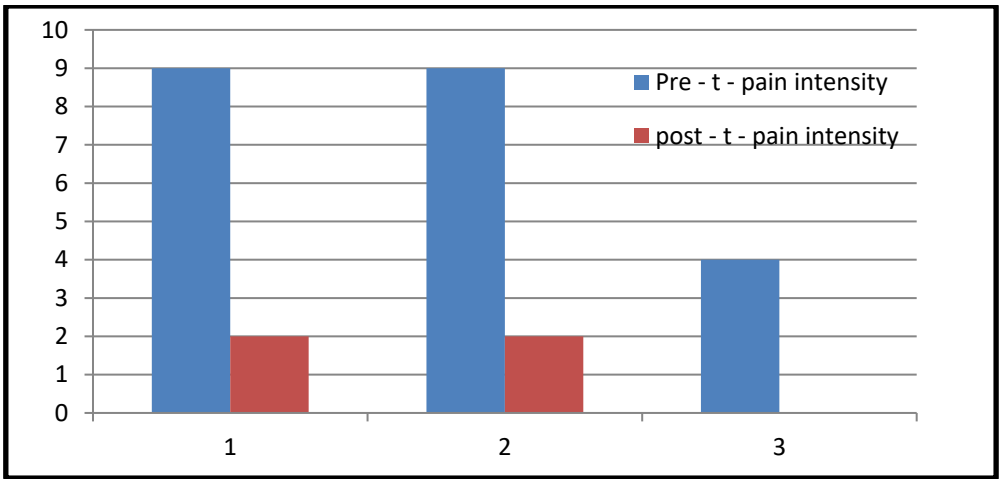

Figure 6: The difference between pre and post pain scale for (group B)

- **Flexion and Extension of cervical:**

Table 7- Shows pre-test and post-test pain flexion and extension for (Group B)

Flexion and Extension of cervical				
characteristics	**Pre treatment**		**Post treatment**	
ROM	**Flexion**	**Extension**	**Flexion**	**Extension**
Patient 1	30	25	40	45
Patient 2	15	45	45	45
Patient 3	35	40	45	45
Mean	26.6	36.6	43.3	45
percentage	59.25%	81.48%	96.29%	100%

The figures below represent the values and scores that have been analyzed in diagrams showing the difference between the values Flexion and Extension of cervical pre and post treatment .

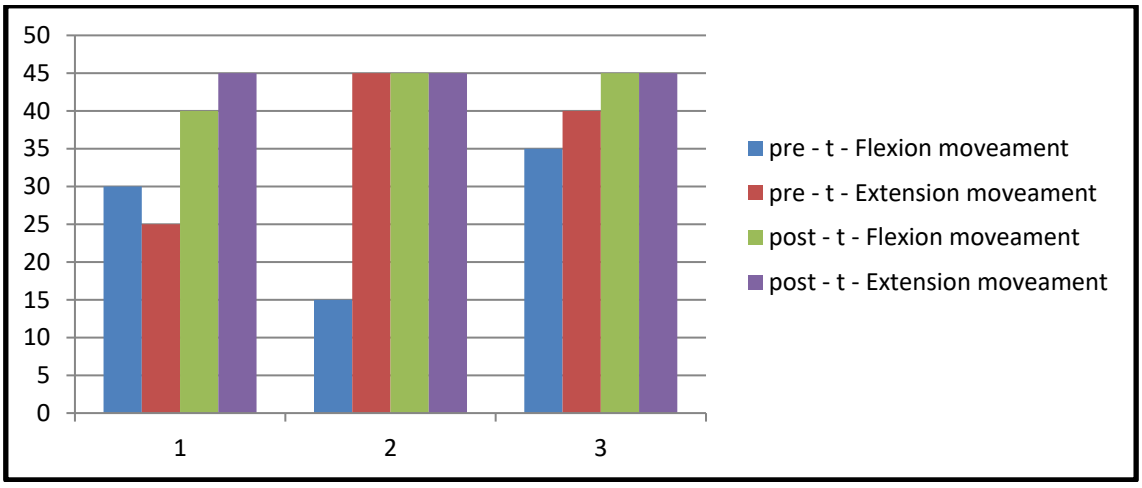

Figure 7: The difference between pre and post flexion and extension for (Group B)

- **ROM. Lateral Flexion for right and left side:**

Table 8- Shows pre-test and post-test ROM lateral flexion for right and left side for (group B)

Lateral Flexion				
characteristics	**Pre treatment**		**Post treatment**	
ROM	**right**	**left**	**Right**	**left**
Patient 1	25	35	40	40
Patient 2	30	45	45	45
Patient 3	35	40	45	45
Mean	30	40	43.3	43.3
percentage	66.66%	88.88%	96.29%	96.29%

The figure below represents the values and scores analyzed in the diagram showing the difference between the R and L lateral flexion values of the cervix before and after treatment.

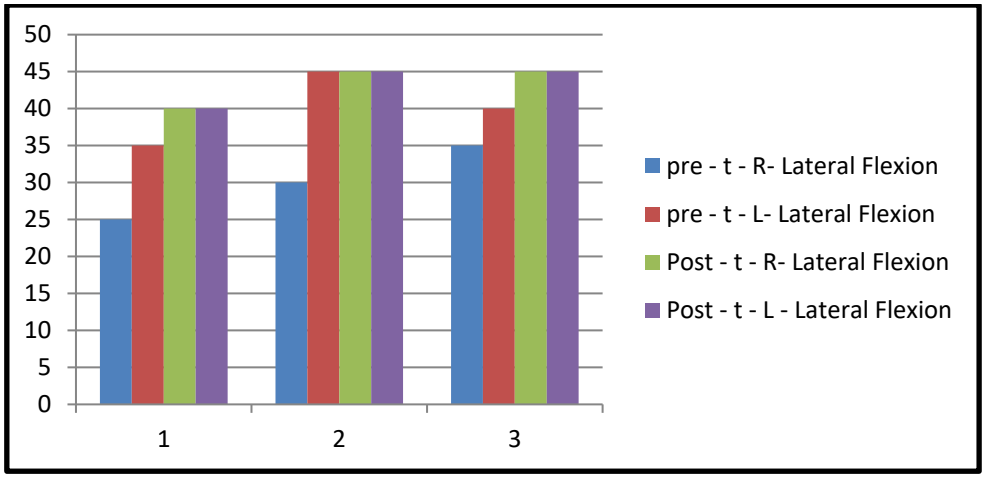

Figure 8: the difference between pre and post ROM lateral flexion for right and left side for (group B)

- **ROM Rotation right and left side:**

Table 9- Shows pre-test and post-test ROM rotation right and left side for (group B)

Rotation				
characteristics	**Pre treatment**		**Post treatment**	
ROM	**right**	**left**	**Right**	**left**
Patient 1	35	65	60	70
Patient 2	50	70	80	80
Patient 3	45	65	70	80
Mean	43.3	66.6	70	76.6
percentage	54.16%	83.33%	87.5%	95.83%

The figure below represents the values and scores analyzed in the diagram showing the difference between the cervical R and L Rotary values of the cervix before and after treatment.

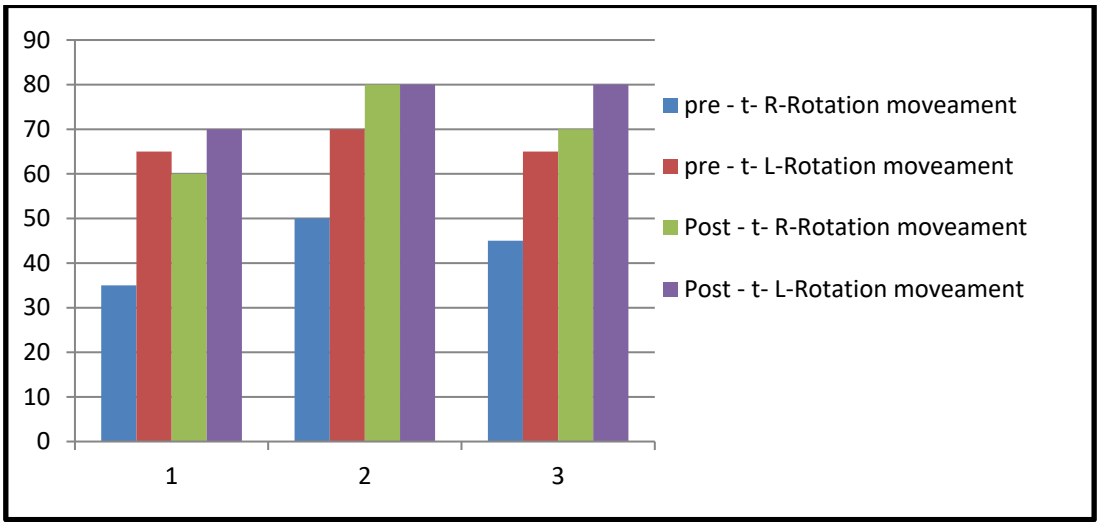

Figure9: The difference between pre and post ROM rotation right and left side for (group B)

Related to examination, there was a noteworthy contrast between some time recently and after treatment in torment concentrated since the cruel esteem of pre-treatment was (Hoppenfeld S.,2009) and post-treatment was where the enhancement rate was (Ozer AF. Et.al, 2009). ,3%). There was a critical contrast between pre-and post-treatment for flexion as the cruel esteem of pre-treatment was and post-treatment was (43. Barlas P. et.al., 2006) where the rate change was (96.29%). Agreeing with the information investigation, there was a noteworthy contrast between pre-and post-treatment to expand since the cruel of pre-treatment and post-treatment was where the rate change was (100%). There was a critical contrast between some time recently and after treatment for right ROM since the cruel esteem of pre-treatment and post-treatment was where the rate enhancement was (96, 29%). According to statistical analysis, there was a significant difference between before and after treatment for left ROM because the mean value of pre-treatment was (40) and post-treatment was (43.3) where the percentage improvement was (96, 29%). There was a significant difference between before and after treatment for right ROM rotation because the mean value of pre-treatment was (43.3) and post-treatment was (70) where the percentage improvement was (95, 83%).

4-4 The compression between two groups:

Table 10- compression between two groups

Variable	Group A	Group B
Pain	2	1.33
Flexion	43.3	43.3
Extension	41.6	45
ROM Lateral Flexion R	41.6	43.3
ROM Lateral Flexion L	50	43.3
ROM Rotation R	65	70

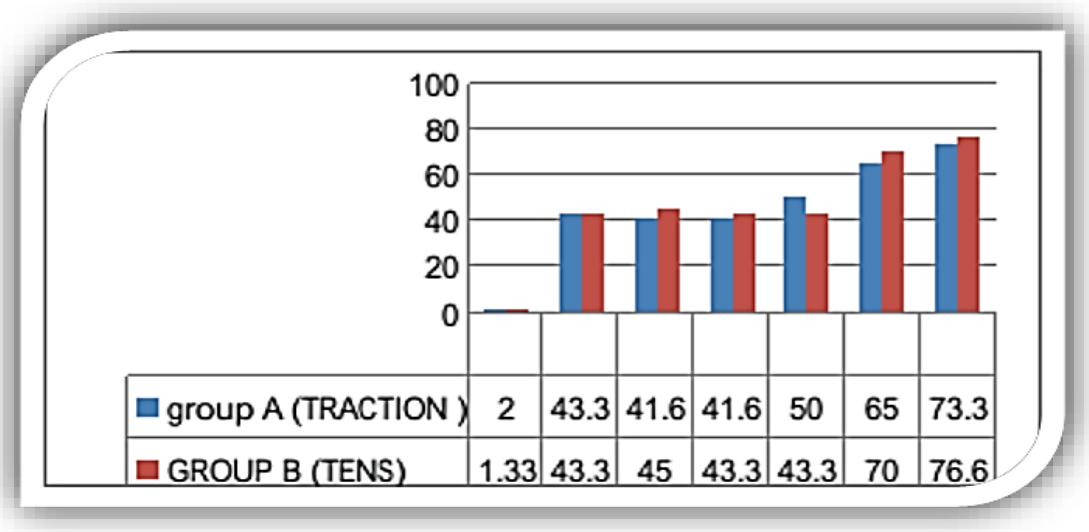

Figure 18: shows compression between two groups

From analysis, there was a significant difference between group A using the traction treatment and group B using the TENS treatment in pain intensity when the mean value for group A was (Binder AI., 2007) and that of group B. There was a significant difference between group A using the traction treatment and group B using the TENS treatment for bending because the mean value of group A was and that of group B was. From data analysis, there was a significant difference between group A using the traction treatment and group B using the TENS treatment in pain intensity when the mean value for group A was and that of group B. There was a significant difference between group A using the traction treatment and group B using the TENS treatment for bending because the mean values of group A were and those of group B were (Tetreault L &Goldstein CL et.al, 2015). From investigation, there was a noteworthy contrast between bunch A utilizing the footing treatment and gather B utilizing the TENS treatment in torment escalated when the cruel esteem for bunch A was which of bunch B was. There was a noteworthy distinction between gather A utilizing the footing treatment and gather B utilizing the TENS treatment for twisting since the cruel esteem of group A which of gather B . According to statistical analysis, there was a significant difference between group A using the traction treatment and group B using the TENS treatment for stretching because the mean value of group A and after treatment. There was a significant difference between group A using the traction treatment and group B using the TENS treatment for the right ROM because the mean value of group A was and that of group B. There was a significant difference between group A using traction treatment and group B using TENS treatment for left ROM because the mean value of group A and group B. There is a significant difference between group A using traction processing and group B using TENS processing to rotate the right ROM because the mean value of group A is and that of group B (Osiri M et.al., 2004).

4. DISCUSSION

The purpose of this study was to investigate and compare the efficacy of TENS and Traction devices in patients with cervical spondylosis for reduced pain intensity and increased range of motion of cervical. (Ross J, 2005). The results of the present study showed a decrease in pain intensity in both groups.

This suggests the existence of a difference between scores of sessions before and after treatment, in patients in group B (who received TENS) after treatment sessions was 13.3%. On the other hand, the percentage of improvement was higher in group A (traction treated) at 16.66%. The application of a range of motion showed that there existed a difference between the pre-and post-treatment sessions for the movements (flexion, extension), (lateral flexion) and (rotation) right and left in the following sessions. Treatment of patients in group A, the improvement rate was (96%, 92.5%) respectively (right 96%, left 100%) (right 81.25%, left 91.66%), and for group B, the rate of improvement after the treatment session was 96.29%. 100% extensor, right flexion 96.29% left 96.29% right rotation 87.5% left 95.83% these results are explained in the table between them after the treatment sessions. In comparing the outcome of our experimental study in agreement with the (of Himanshi Sharma, and Nirali Patel,2014). Effectives of TENS versus intermittent cervical traction patients with cervical radiculopathy. Their results showed that TENS therapy was more effective than Traction Divac in patients with cervical spondylosis.

5. CONCLUSION

Within the limitations of the study, the following conclusion was that adding TENS therapy to a physical therapy program (manual massage, exercise) would be more effective in managing symptoms of osteoarthritis. cervical vertebrae, relieve neck and arm pain, reduce neck crippling, and improve equipment traction of activities of daily life.

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