THE EFFECT OF INTERMITTENT TRACTION ALONG WITH NEURAL MOBILIZATION IN CERVICAL RADICULOPATHY

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ABSTARCT

Objective: The main objective of the study is to find out the effectiveness of traction alone or traction along with neural mobilization in physiotherapeutic management of cervical radiculopathy.

Methodology: It is comparative study with controlled randomized trials. The study design is cohort study. It's a convenient sampling and the technique is non-probability sampling technique. The hypothesis is tested by applying **chi-square** which yielded that traction along with neural mobilization is more effective in relieving pain and functional limitation than any other technique.

Results:

Moreover, my study brings light to the following facts:

It is occurred mostly in the age range from 40 to 50 and even beyond 50 years of age.

By applying chi-square, I have proved my alternate hypothesis **"Cervical traction along with neural mobilization is effective in relieving pain and functional limitation in cervical radiculopathy**."

About 41.2% of patients have good recovery and 36.2% have normal recovery after the application of techniques due to their lack of interest.

Conclusion:

The prognosis is good among mostly patients after applying the techniques. It was concluded that application of intermittent cervical traction along with neural mobilization is more effective than traction alone with exercises afterwards.

Keywords:

Cervical radiculopathy, Cervical spondylosis, Neural mobilization, Traction, Spinal cord compression, Myelopathy, Disc herniation.

Introduction:

Most of the studies related to the musculoskeletal disorders have been focused from last thirty years. The normal degenerative process of cervical spine in old age is considered as one of the most common cause of cervical radiculopathy, myelopathy and cervical neck syndrome. The cervical spine shows early degenerative changes because it has wide range of mobility as compare to thoracic spine. So, it is calculated that there is comparatively more load lay on the cervical spine than thoracic and lumber region. It is proven that cervical intervertebral discs are the first one affected by such degenerative changes and they begin at the third and forth decade of life. [14, 24]

The condition in which one and more than one nerve affected is known as Radiculopathy. The word Radix is used for affected nerve. The presenting symptoms are pain i.e. radicular pain along with numbness, weakness, tingling sensation and loss of motor activity of specific muscles supplied by respective nerve.[7]

As if there is nerve root impingement in the neck, it can produce symptoms of radiating pain in arm and forearm along with weakness and numbness and hence the condition is known as **"CERVICAL RADICULOPATHY".** The particular level of radiculopathy depends upon

which cervical symptoms appear. And these symptoms are also come under the term of **radicular pain**. If there is nerve root impingement above the C6 vertebra then it is known as C6 radiculopathy. Cervical radiculopathy can also be resulted from other conditions, such as Tumor, Fracture and Sarcoidosis. Affected nerve may be Inflamed, Compressed and working ineffectively due to lack of blood flow. The impingement of cervical nerve results from overpressure with bone, muscle, tendon and cartilage. Cervical traction along with neural mobilization produces an immediate effect in relieving pain and improving function. Both the above given techniques are effective in improving hand grip.[5]

Neural mobilization was described by Maitland in 1985, Elvey in 1986 and it is refined by Butler in 1991, it is an add-on to assess and treat the neural pain syndromes including cervical radiculopathy.[29]

Neural tests are used to stimulate and move neural tissues in order to check the mobility and sensitivity to neck and upper limb movement. The tests related to cervical radiculopathy are Passive neck flexion (PNF), Slump test, Upper limb tension test (ULTT).It's a technique to mobilize the nerve and it is obviously preferable and even considered more safe than cervical manipulation. Both cervical mobilization and neural mobilization are the effective technique to alleviate the symptoms and gain full ranges.[4, 10, 25]

Spurling test will be usually sufficient to diagnose the radiculopathy and determine the affected nerve root level. Spurling's test along with other tests include neck distraction test, Valsalva maneuver and ULTT. Diagnostic imaging such as magnetic resonance imaging, computed tomography, or myelography should be used as presurgical evaluative tools or when tumor or other etiology besides disc herniation or spondylosis is suspected.[27]

It was estimated that C7 and C6 have approximately 60% and 25% of injury risk respectively. Osteophyte formation, decreased disc height, degenerative changes in unconvertible joint anteriorally and facet joints posteriorly. High risk factors include heavy weight lifting more than 25Ibs, smoking, driving and operating vibrating objects. Less frequent causes include tumors of spine, infections, giant cell arteritis, synovial chondromatosis and synovial cyst.According to the data it was estimated at 3.3/1000 with an average rate of 8/1000. Peak incidence occurred at 4th and 5th decade with annual incidence at the rate of 2.1/1000. In

another survey it was 83% in 1000000 of population. The sexual predominance is not clear yet. Some of the studies show that incidence in males is somewhat slightly high than females.

1, 6, 34,16,24,28,30,7

Cervical traction along with neural mobilization produces an immediate effect in relieving pain and improving function. Both the above given techniques are effective in improving hand grip. According to M. nano intermittent traction is helpful in increasing frequency of myoelectric signals as well as increasing the blood flow in muscles. In this way it aids to reduce muscle spasm. Both intermittent and continuous traction are helpful in minimizing pain and improving nerve function.[21]

The study has main focus on the combine effects of traction along with neural mobilization with traction alone with the basic PT interventions given to both groups.

NEURAL MOBILIZATIONS AND TRACTION

2.9.1 Monthly Treatment Plan

Baseline Treatment

First of all, immobilize the neck with cervical collar. Soft cervical collar is used for temporary immobilization. It is recommended for daytime only. But in some cases it does not significantly limit the movement then in that case hard collar should be advised. The rigid orthoses like Minerva body jacket, Philadelphia collar are used. After immobilization the isometric exercises is the second to option in the plan of treatment. Isometric exercises are used to maintain the tone of muscles that get distorted after the continuous use of collar. Modified pillows are frequently recommended for the patients with cervical spondylosis. They can better align the spine during sleep and provide symptomatic relief to the patient. Electrical therapy includes hot packs, S. W. D., superficial heating devices including hot packs and infrared lamps can be used. Intermittent traction is very significant in relieving pain as it temporarily relieve the impinged nerve. Manual and Mechanical traction both are useful

treatment maneuvers. As they widen the opening of intervertebral foramina. Exercises prescribed in the patients are isometrics initially. [23, 8]

1-3 Months

Multiple angle isometrics, strengthening of cervical extensors along with stretching of upper back muscles. Massage, mobilization, and manipulation are also the part of physiotherapy treatment. Mobilization and manipulation should be performed by a qualified and trained physiotherapist at the limit of ROM in order to increase the ROM and gentle light mobilization to relief pain and maintain the attained ROM. Grade III mobilization is given at this stage. Grade IV and V mobilization is given to increase the ROM. In severe degenerative condition and in old age aggressive mobilization is contraindicated. Neural mobilization is always the choice of treatment in radiculopathy. Grade II intermittent manual traction is given to mobilize the nerve and the nerve mobilizes is selected according to the patient's condition sometimes more convenient and better option than mechanical traction. [22,9,33]

3-6 Months

Pain is relieved upto this stage and ROM is also achieved upto the mid of normal range. Grade IV and V mobilization is also done to complete the ROM. Grade IV and V mobilization is done with care especially case of elderly patients and patients with severe degenerative changes. Grade III traction continuous traction is convenient for patients at this stage is given to mobilize the single nerve. The nerve mobilize is selected according to the presentation of patients. Electrical modalities and stretching is given to prevent the associated sign of discomfort. [3, 17,]

Material and Methodology:

The study includes 80 diagnosed cases of cervical radiculopathy. The patients reported are from middle to old age group. The inclusion criteria are the patient having cervical radiculopathy secondary to cervical spondylosis and the exclusion criteria includes causes other than spondylosis (tumor, disc herniation, and trauma). It includes all the patients coming to mayo hospital and Haq orthopedics during the 6 months after the approval of synopsis. The

study includes two groups- experimental group having intermittent cervical traction along with neural mobilization and the control group receiving traction alone with the basic physiotherapy maneuvers given to both the groups. Consent form will be signed from all the participants. Pain is assessed by using VAS and ROM was taken with goniometer. By means of structured questionnaire the data is collected and it is analyzed by using SPSS V-16 and the hypothesis is checked by applying chi-square.

Statistical analysis:

Table 1 : Frequency & Percent of Patients Diurnal Variation Of Pain (SPSS-16)

diurnal variation of pain

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	evening	11	13.8	13.8	13.8
	morning	15	18.8	18.8	32.5
	work	39	48.8	48.8	81.2
	night	15	18.8	18.8	100.0
	Total	80	100.0	100.0	

Chart 1

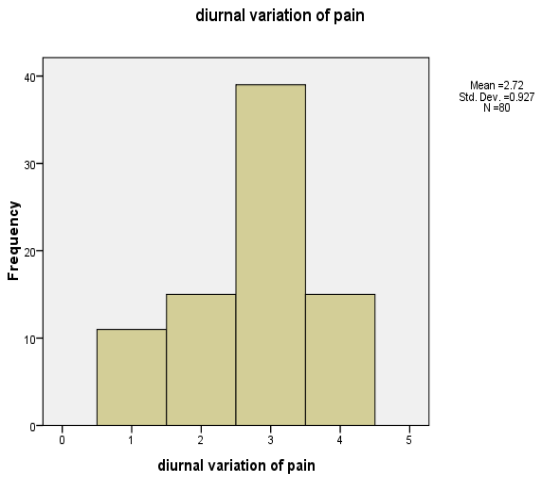
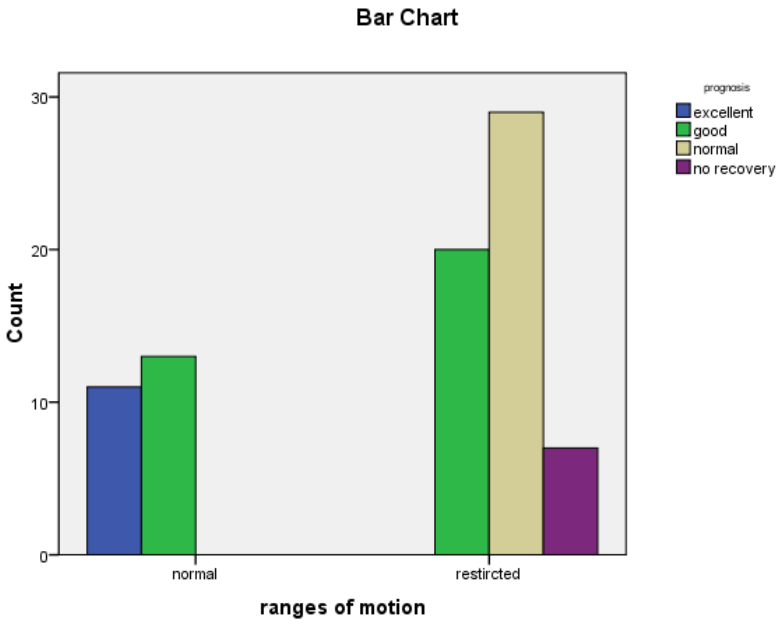


Chart no 2 **Multiple bar chart to**

differentiate restricted and normal ROM



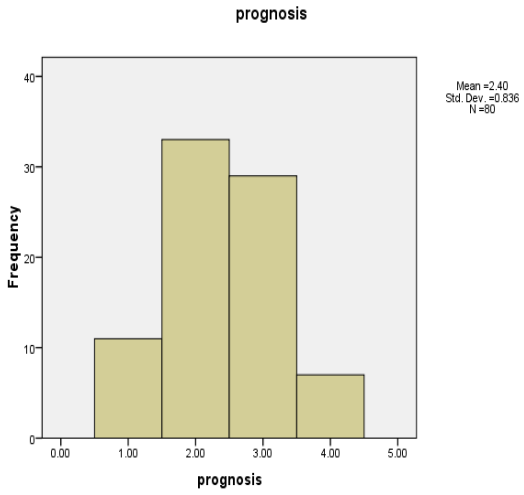
The above given graph shows that prognosis was good as measured by means of ROM. Among the patients with mild restriction the prognosis was excellent and almost all the patients gain full ROM. The patients presented with severe restriction the prognosis was good in them as well small no. of patients left with no recovery otherwise mostly patients show average or even above average results after application of technique.

Chart 3: Histogram and Pie chart of Patients Prognosis (SPSS-16)

Table 2: Frequency & Percent of Patients Prognosis (SPSS-16)

Prognosis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	excellent	11	13.8	13.8	13.8
	Good	33	41.2	41.2	55.0
	normal	29	36.2	36.2	91.2
	no recovery	7	8.8	8.8	100.0
	Total	80	100.0	100.0	



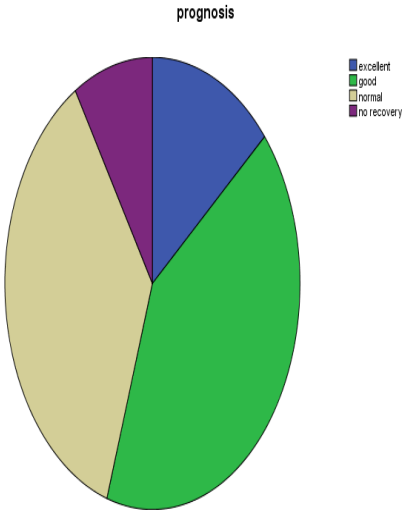


Table :3

ranges of motion * prognosis Cross tabulation						
ranges of motion		Prognosis				Total
		Excellent	Good	normal	no recovery	
	Normal	11	13	0	0	24
	Restricted	0	20	29	7	56
Total		11	33	29	7	80

Table:4

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.482[a]	3	.000
Likelihood Ratio	53.487	3	.000
Linear-by-Linear Association	36.150	1	.000

Table:4

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.482[a]	3	.000
Likelihood Ratio	53.487	3	.000
Linear-by-Linear Association	36.150	1	.000
N of Valid Cases	80		

Chart 5: multiple bar chart

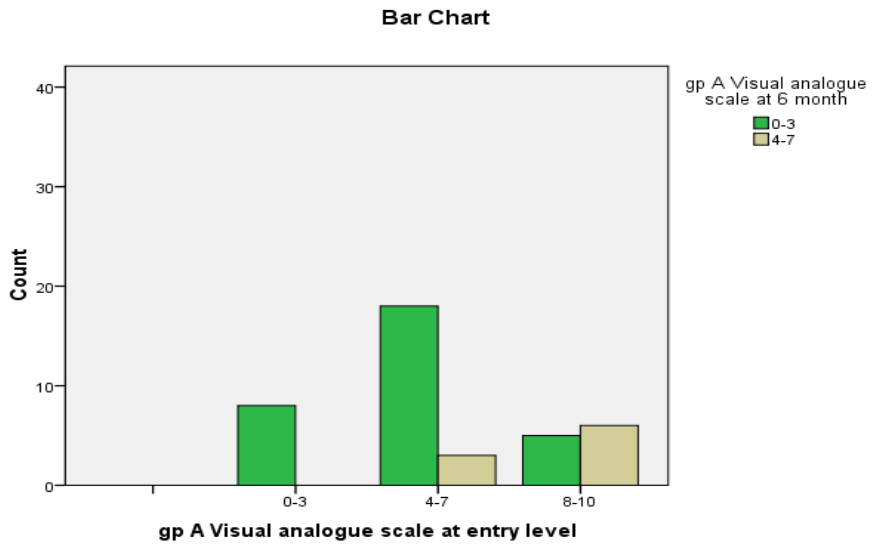


Table :5

Chi-Square Tests

	Value	*Df*	*Asymp. Sig. (2-sided)*
Pearson Chi-Square	*1.023E2*[a]	*9*	*.000*
Likelihood Ratio	*121.362*	*9*	*.000*
N of Valid Cases	*80*		

Group A include those 40 patients who had receive intermittent traction along with neural mobilization and show more significant results than group B. In the bar chart the pain is the recovery is checked in terms of pain by using VAS rating from 0 to 10.i designated 0-3 to mild pain ,4-7 to moderate and 8-10 to severe pain. hence the results shows in bar chat shows that at 6 month patients mostly move from severe to moderate range and those with good recovery to mild range and severe range is vanished as. The results are confirmed by applying chi square and hence proved significant.

Chart 6

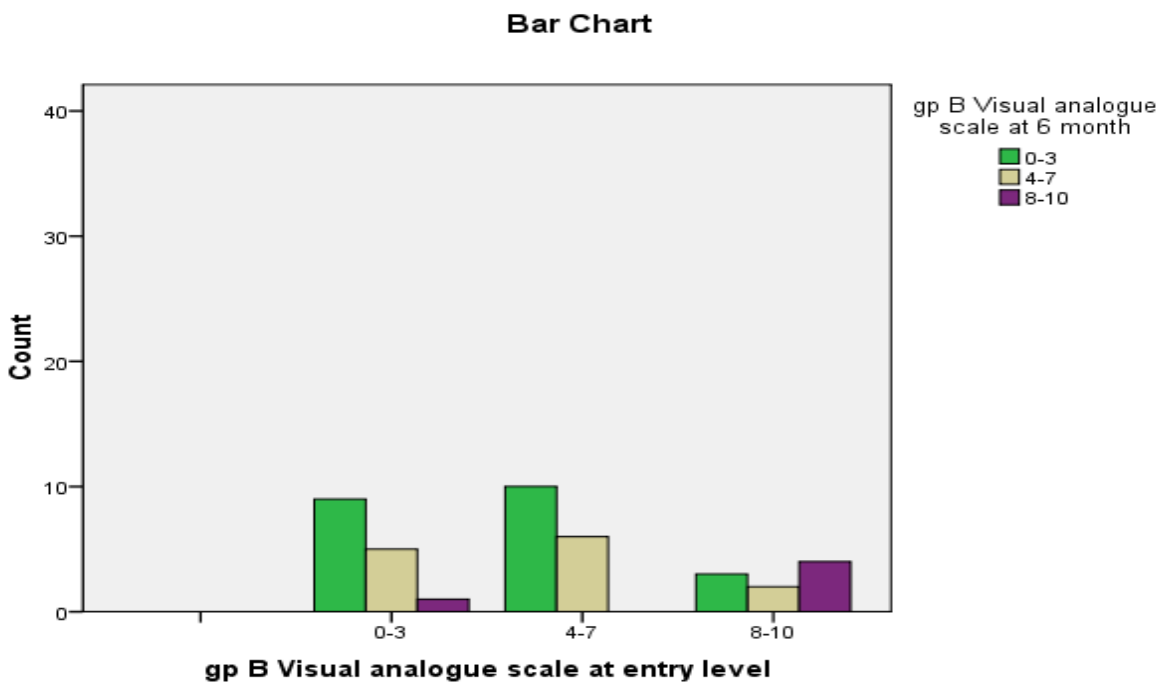


Table: 5

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	83.233[a]	6	.000
Likelihood Ratio	112.893	6	.000
N of Valid Cases	80		

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	83.233[a]	6	.000
Likelihood Ratio	112.893	6	.000

. 7 cells (58.3%) have expected count less than 5. The minimum expected count is .11.

In this we have comparison between group B patients who had treatment with traction only they also show improvement but insignificant results are obtained overall. At 6 month level some of patients presenting with severe pain and only small no of patients obtain full ROM.

Chart:7

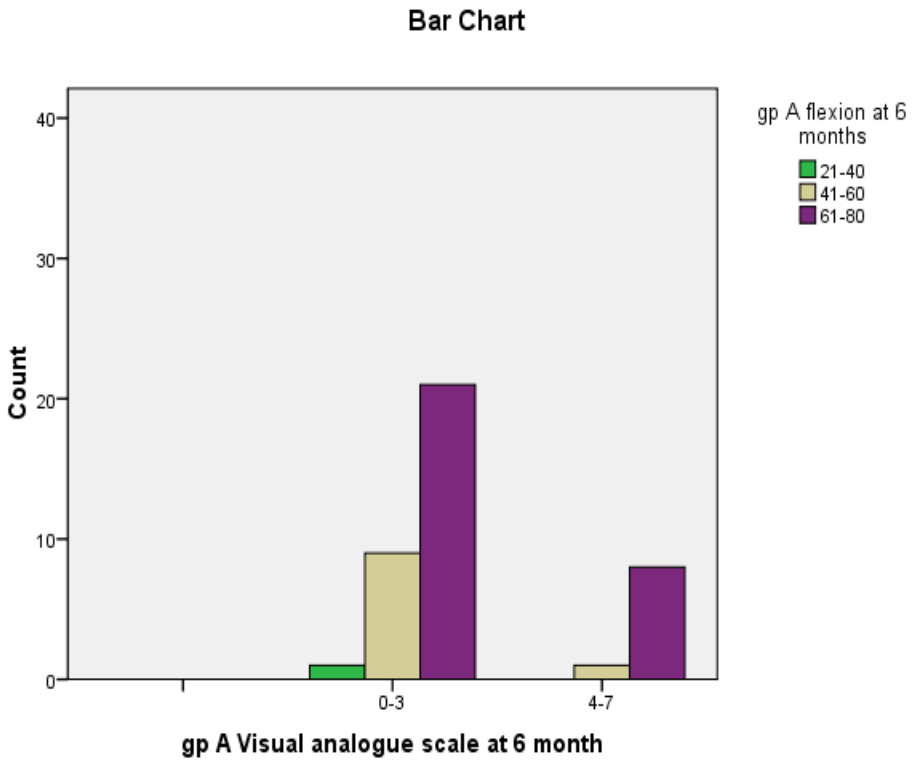


Table 6 : gp A flexion at3 months

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	40	50.0	50.0	50.0
21-40	1	1.2	1.2	51.2
41-60	10	12.5	12.5	63.8
61-80	29	36.2	36.2	100.0
Total	80	100.0	100.0	

In group A in which patient receives both traction with neural mobilization, patients at 6 month level achieve end range of motion with minimal pain and the results are confirmed by applying chi-square.

Table: 7

gp A flexion at 6 months

	Frequency	Percent	Valid Percent	Cumulative Percent
21-40	1	1.2	1.2	51.2
41-60	10	12.5	12.5	63.8
61-80	29	36.2	36.2	100.0
Total	80	100.0	100.0	

Table :8

gp B flexion at 6 months

	Frequency	Percent	Valid Percent	Cumulative Percent
	40	50.0	50.0	50.0

21-40	15	18.8	18.8	68.8
41-60	18	22.5	22.5	91.2
61-80	7	8.8	8.8	100.0
Total	80	100.0	100.0	

The above given frequency tables of group A and B clearly shows significant improvement in Group A patients than group B.As after 6 months of treatment application group A patients 29/40 fall into end range of motion as in group B only 7/40 fall into end ranged of motion.

Results:

In my study, I have taken sample size of about 80 patients. Both male and female gender was considered in my study, 36 were female and 44 were male. Age ranges from <40 to 50<. Among the patients some had neck pain that was localized others presenting with radiculopathy. It was clear from the calculated data that cause of C.S was poor posture in 37 patients, trauma in 20 patients and chronic fatigue syndrome in 23 patients. And from above given values it was clear understood that poor posture was the major cause of it. It was calculated from the data that socioeconomic status had somehow more or less influence in the occurrence of the disease 42 patients in lower class, 35 patients in middle class and 3 patients in upper class. But according to my data it was more prevalent among the lower class. It was reported by the patients that there is diurnal variation of pain in C.S so we had 11 patients who had pain in evening, 39 had during work time and 15 during night time. So work was considered to be a major cause of it. It was seen and proved by results that traction and neural mobilization is very effective intervention in the treatment plan of patients with radiculopathy. The prognosis was excellent after applying such maneuvers in 11 patients, good in 33, normal results were obtained in 29 and unfortunately due to irregular treatment sessions and least interest by patients 7 were presented with no improvement in their condition.

Discussion:

Cervical radiculopathy is the frequent cause of neck pain so the accurate treatment approach towards the disabling condition is essential.[24]

There is evidence in the reliable literature that conservative management as compare to surgical approach has positive outcomes.[19]

Cervical radiculopathy is a sensorimotor deficit syndrome. The patients frequently visit the clinics with this condition. Mostly patients present with the degenerative condition such as cervical spondylosis and these patients lie in the age group of 35- 65 years. Others presented cases have degeneration secondary to traumatic incidence. Sometimes there is even a trivial trauma that patient does not remember.[2, 26]

According to a case study by Moeti and Marchetti, they emphasized on the beneficial effects of intermittent cervical traction, neck retraction exercises scapular strengthening exercises, mobilization and manipulation techniques come up with good prognosis.[18]

Several articles in literature can prove the beneficial effects of traction with the basic physiotherapy management. Basic physiotherapy management includes electrotherapy modalities and exercises i.e. ranges of cervical spine plus isometrics. This study mainly focuses on two techniques to alleviate the pain and improve function, intermittent cervical traction and neural mobilization. Intermittent traction is useful in acute painful condition as it is helpful in minimizing pain without exacerbating the symptoms. Other basic physiotherapy management regarding the condition includes the strengthening and stabilizing exercises.[15, 30]

As it is observed that intermittent cervical traction at C7 level improves the grip of patient.[11]

Only few of studies are conducted to evaluate the combine effect of cervical traction along with neural mobilization. The main objective of the study is to evaluate the individual as well as the combine effect of both treatment methods. Cleland explained that physical therapy maneuvers along with manual traction assists to enhance the stabilizing effect of muscles and ligaments around the cervical joints and hence helping in improving the supportive effect of cervical region. Stretching is a physiotherapeutic maneuver that exerts a provoking effect on positional and movement proprioceptors in enhancing the support and strength of the joint. In this way this is helping to restore the normal anatomical position.[12, 13]

Murphy D and associates had a observational cohort study in order to study the effect of cervical manipulation, neural mobilization, stabilization exercises along with cervical over door traction in the patients having radiculopathy secondary to cervical spondylosis. The result showed that out of 31 patients at the time of discharge 24 have shown the minimal significant changes in sign and symptoms according to the Bournemouth disability questionnaire.[20]

Wainner S and associates have assessed the reliability and accuracy of individual clinical examination items and self-report measures for diagnosis of cervical radiculopathy and has Identified and assessed the accuracy of an optimum test-item cluster identified (ULTTA, Spurling's test, neck distraction test and ipsilateral cervical rotation >60 degrees) for indicating cervical radiculopathy. They have reported that in comparison with a reference standard of neurodiagnostic testing, the presence of these 4 findings were associated with a positive likelihood ratio (+LR) of 30.3 (sensitivity = 0.24; 95% confidence interval [CI] = 0.005, 0.43; specificity = 0.99; 95% CI = 0.97, 1.0) and post test reliability of 90% for detecting cervical radiculopathy. [31, 32]

The comparison between the effects of continuous or intermittent cervical traction is a controversial topic needs debate. A study done that proves both had beneficial effects on minimizing symptoms and improving function but intermittent cervical traction is the prior approach than continuous traction.[31]

According to another recent study it is concluded that neural mobilization imparts more beneficial effects with the basic physiotherapy management. Neural mobilization is one of the most accepted currently used physiotherapy approaches.[32]

Conclusions:

The study comes up with some significant conclusions. The disease is more prevalent among males than females. It was common among the people with fixed neck posture like computer operators or office workers. It was clear that overwork and poor posture can increase the chance of its occurrence. Mostly patients had restricted ROM. s. The people who had more knowledge about their problem can easily understand and get treatment on time and relieved.

I had come up with good outcome in almost 85% of patients after applying traction along with neural mobilization. More than 50% of the patients in physiotherapy department were Surgeons and physicians recommended physiotherapy treatment for the better outcomes. There are many interventional techniques found in literature with unauthenticated results. Further research is also warranted on evaluating the effectiveness of cervical traction along with neural mobilization.

I was noticed that arm functioning was proven to be affective during the disease process than avoidance to do activity with affective limb. Because decreased level of functioning results in muscular atrophy.

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