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Comparison between the effectiveness of Manual Mulligan traction and intermittent electric traction in cervical spondylosis.

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Abstract:

Objective: *Traction is found to be effective in treating neck pain in Cervical Spondylosis. This study compares the effectiveness of Manual Mulligan traction (MT) with intermittent electric Traction (IET) in subjects having Cervical Spondylosis (CS).*

Purpose of study: *Insufficient evidence to assess the effectiveness of manual therapy and exercise for patients having neck disorders with radicular symptoms. There were no studies which compared manual mulligan traction with electric traction.*

Method: *22 subjects showing spondylotic changes on cervical spine (Cx) X-ray were divided into 2 groups (A&B) randomly. Outcome measures used were Numerical Rating Scale (NRS) for pain, Cx range of motion (ROM) by inclinometer and Neck Disability Index (NDI). Group A was given MT and group B was given IET for 7 days. Both groups were also administered a common conventional exercise protocol. Traction was given for 9 minutes (20 seconds hold and 10 seconds relax period * 18 times), and the weight of pull for traction in both groups was 1/10th of the subject's body weight. To calculate the amount of pull in Manual Traction, Mulligan belt was modified by attaching 2 spring weighing scales and the resultant force formulae was used. At the 7th day, post-treatment values were noted. T-test was performed for data analysis.*

Results: *The study showed significant improvement in ROM of the subjects treated with MT (P values for all cervical spine movements < 0.005). However, the other parameters (NRS & NDS) did not show any significant changes. It was also observed that 63.6% treated with MT had complete relief in radiation whereas those treated with IET only 9.09% had complete relief.*

Conclusion: *Manual mulligan traction can be considered as the treatment of choice for Cervical Spondylosis over Intermittent electric traction, also in cases with radiculopathy.*

I. Introduction

Neck pain is becoming increasingly common throughout the world. The overall prevalence of neck pain in the general population ranges between 0.4% and 86.8% (mean: 23.1%); point prevalence ranges from 0.4% to 41.5% (mean: 14.4%); and 1 year prevalence ranges from 4.8% to 79.5% (mean: 25.8%).Prevalence is generally higher in women, higher in high-income countries compared with low- and middle-income countries and higher in urban areas compared with rural areas. Most studies indicate a higher incidence of neck pain among women and an increased risk of developing neck pain until the 35–49-year age group, after which the risk begins to decline[1]. In cross-sectional studies neck pain has been associated with self-reported poor general health status, psychological distress, and previous neck injury, in addition to other factors such as occupational tasks and obesity. Neck pain and its related disability have a huge impact on individuals and their families, communities, health-care systems and businesses[2] .It also has major economic consequences through the cost of health-care, work absenteeism, insurance, and pressure on health-care systems.

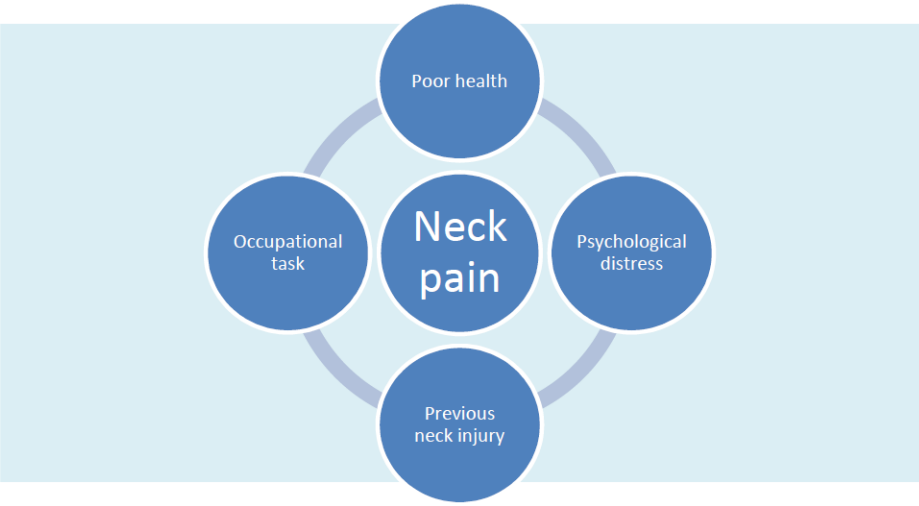
The natural history is unclear. Nonspecific neck pain is generally caused due to wrong posture. The other causes are cervical spondylosis, whiplash, Sprains, rheumatoid arthritis, ankylosis spondylosis other inflammatory diseases.

Cervical Spondylosis signifies progressive degeneration of the intervertebral disc leading to changes in the surrounding structures especially bones and meninges [13].Its signs and symptoms include pain, limitation of neck movement, head ache, pain radiating to upperlimb ,paraesthesia, Vertibro-basilar insufficiency may be present . This signs and symptoms can be present singly or in combination. However it has been observed that in adults more than 40 years, about 60% have degenerative disc disease, 20% have

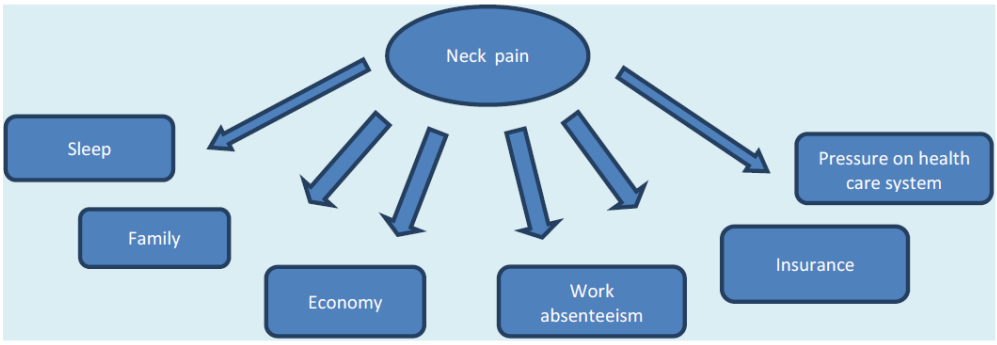
foraminal stenosis, both of which may irritate nociceptors. Furthermore, advanced spondylotic changes can narrow the vertebral and intervertebral foramina and restrict cervical mobility resulting in pain and dysfunction [13].

The Physiotherapy treatment of cervical spondylosis includes Patients education, posture corrections, and ergonomics, Electrotherapy, Manual Therapy and Exercise.

Association of Neck Pain



Impact of Neck Pain



The recurrence rate of neck pain is high; approximately 60%, of all episodes are followed by a relapse [3].Although neck pain is the most frequent disorders treated by physiotherapist all over, there is no consensus about the management of this condition. Many interventions like traction, active and passive exercise, ultrasound, transcutaneous electrical nerve stimulation, Interferential therapy, patient education(accepted as standard forms of practice) are used generally for the treatment, but the evidence of their effectiveness is lacking .

A study shows Combined manual therapy and exercise has resulted in improved patient outcomes or satisfaction levels when compared to spinal manipulation or exercise alone [4]. In the other study there was no statistically significant difference between continuous and placebo traction in reducing pain or improving function for individuals with chronic neck disorder with radicular symptoms [10]. Although several studies have included patients with radicular symptoms, the intervention effectiveness on these symptoms was not measured. Reports of studies on the efficacy of traction for neck pain do not allow clear conclusions due to the methodological flaws in their design and conduct [3]. To enhance our ability to identify subgroups of patients with neck pain, improve our clinical decision-making, and improve treatment effectiveness, future research is needed.

One of the commonly used treatments for CS is traction. Traction can be given in various forms such as manual traction, motorized traction, suspension and bed traction [3]. Out of these the most commonly used are the manual and motorized (electrical) traction. Which one is more effective form of treatment is unknown. There were no studies which compared manual traction with electric traction. Thus the purpose of our study is to compare the effectiveness of manual mulligan traction with intermittent electrical traction.

II. Methodology

The study was performed at Yashwantrao chauhan memorial hospital. 22 subjects meeting the criteria were chosen for the study. The duration of study was 2 months.

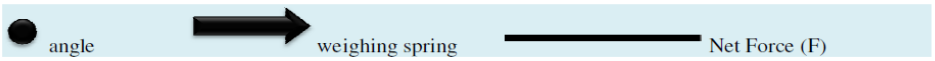
Including criteria
Age group – 25 to 50 both male and female
Neck pain
Radiculopathy
Showing x-ray changes

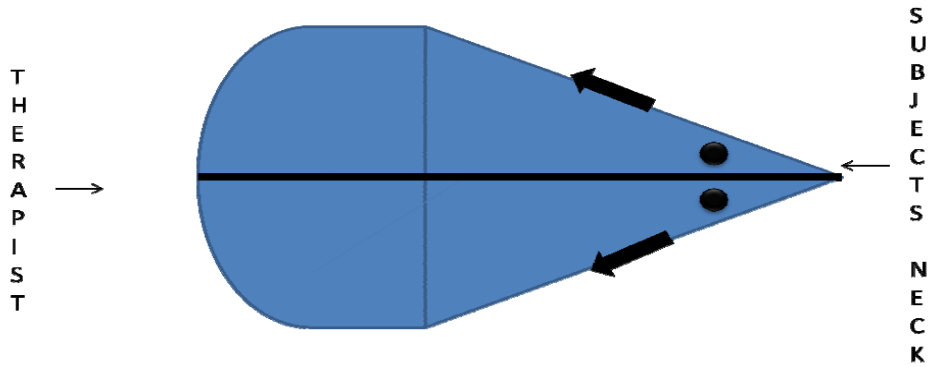
Excluding criteria
Motor weakness
Sensory variation
Vertigo dizziness
Whiplash or any other injuries

Selected subjects were divided into two groups (A & B) randomly. Detailed evaluation was done. Outcomes measures used were Numerical rating scale (NRS) for Pain; Range of Motion (ROM) measured using inclinometer and Neck disability Index (NDI). Both the groups were given traction for 9 minutes which included 20 seconds hold and 10 seconds relaxation period *18 . $1/10^{th}$ of the total body weight applied during cervical traction provides better results [15], thus we have used it in the study. Weight can be easily specified on the electrical traction. In manual traction the amount of pull differs from therapist to therapist. Thus, in order to make the manual traction objective 2 spring weighing scales were attached to the belt (fig. 2). These spring weighing scales were verified and validated. When the springs are parallel to each other the resistance is addition of both the spring resistance [5] .Here the resultant force was calculated using the following formula (fig.1):

Net Force of pull = F1 cos Angle 1 + F2 Cos Angle 2
Since F1 (force in spring 1) = F2 (force in spring 2) and angle 1 = angle 2
Net Pull = 2 F cos angle
F = Net pull / 2 cos angle (provided the springs start at the same points)
Net pull =$1/10^{th}$ of TBW (total body weight)
Therefore, F=$1/10^{th}$ of TBW/2cos Angle

Figure 1 Top view of Manual Mulligan traction





For the subjects in MT the pull was applied at the affected level eg. If the subject has pain shoulder neck line the fingers are place at C 3 vetrebral spine thus relieving the C4 nerve root and for IET the neck was placed according to the affected area for eg. If lower cervical spine is involved neck was place in 30 degree of flexion and those having upper cervical involvement were kept in neutral spine[7]. After 7^{th} day post treatment NRS, ROM and NDI were measured again. With the help of statistician analyses was done using T test.

FIGURE 2: Modified mulligan traction belt

III. Statistical Analyses

Student's t test was performed and following results were found. (Significant P values for all cervical spine movements < 0.005)

Table 1

Movements	P value	Significance
Flexion	0.005	Significant
Extension	0.008	Non-Significant
Right side flexion	0.0006	Significant
Left side flexion	0.001	Significant
Right side rotation	0.004	Significant
Left side rotation	0.01	Non- significant
NRS	0.06	Non- significant
NDI	0.15	Non- significant

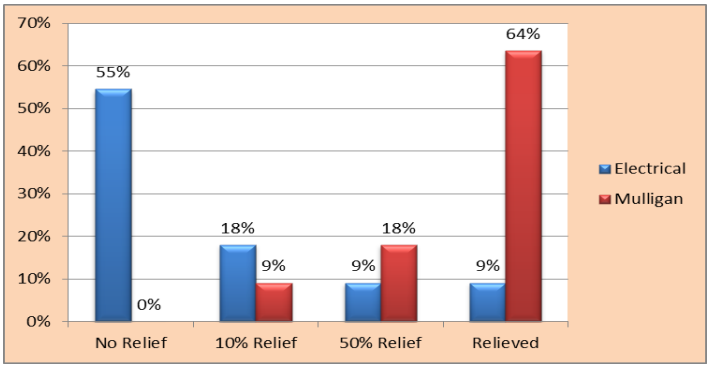
P value of different range of motion, NRS and NDI

Table 2

	MT	IET
Average days taken for treatment	6.36	7

Comparison of Average days taken in both treatments

Graph 1



Shows the percentage of radiation relief in both groups.

Table 3

Movements	Manual mulligan traction	Intermittent electric traction
Flexion	0.001	0.006
Extension	0.0007	0.005
Right side flexion	0.0008	0.02
Left side flexion	0.003	0.11
Right side rotation	0.007	0.02
Left side rotation	0.002	0.03

Shows the significance value within the group for range of motion.

IV. Result

Table 1 shows that the p value for flexion, right side flexion, left side flexion, right side rotation are < 0.005 between two groups. Thus they are significant. Whereas for the value for extension and left side rotation are not significant. Also the change in NRS and NDI are not significant between two groups.

Table 2 shows that the average days taken by MT are less than that of IET. Thus MT is faster treatment compared to IET.

Graph 1 compares the percentage of radiation relief between the groups. It clearly shows that MT gives better radiation relief than IET.

Also within the group (table 3) it is observed that the p values are significant in MT for all ROM where as in IET it's not significant.

V. Discussion

Intermittent traction improves the circulation to the tissues and reduces swelling of the tissues thus helps to relieve the inflammatory reaction of nerve roots. This approach is clinically therapeutic for two reasons. Firstly it is a form of stretching that lengthens all vertically oriented soft tissues of the neck. Secondly it decreases the weight bearing compression forces upon the joint surfaces, intervertebral discs and intervertebral foramina of the cervical spine. Some theories suggest that the stimulation of the proprioceptive receptors in the vertebral ligaments and monosegmental muscle may alter or inhibit abnormal neural input from these structures.

When we stretch the neck in one direction, we introduce a stretching and lengthening force into most every soft tissue of the neck. However, we also create a compression force on the opposite side of the spine. For example, if we stretch the subject's neck into right lateral flexion, we do so by moving the neck into left lateral flexion, thereby causing compression to the left side. Cervical traction achieves a desired stretch, without causing any compression.

In MT the force of pull is directly applied at the affected level of the spine. As the traction separates the spinous process, the intervertebral foramina size increases thus relieving the compressed nerve root giving faster relief in radiation and also improves the intervertebral movements at that level. In IET the pull is distributed over the entire cervical spine not concentrating it on a particular affected area. Thus IET gives a generalized treatment unlike MT which is localized on affected segment.

VI. Conclusion And Future Scope

The result of the study suggests that the effect of MT is better than IET in CS. Thus Manual mulligan traction can be considered as the treatment of choice over Intermittent electric traction for Cervical Spondylosis with or without radiculopathy.

Further work may consider a randomized controlled trial for effectiveness of Mulligan traction. Retention of effects after 4 weeks can be evaluated.

Limitations: Fewer subjects were taken.

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