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A STUDY TO COMPARE DIFFERENT DURATIONS OF LUMBAR TRACTION IN THE MANAGEMENT OF PATIENTS WITH LOW BACK PAIN

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ABSTRACT

Background and Purpose: Low back pain (LBP) is one of the most common complaints in the general population, affecting about 70-80% of the population at some point in life. LBP management comprises a wide range of different intervention strategies. One of the treatment options for LBP that has been used for thousands of years is traction therapy, the application of force that draws two adjacent bones apart from each other in order to increase their joint space. The purpose of this study was to compare the effectiveness of two different hold and rest time combinations with 60s hold and 10s rest, 80s hold and 20s rest i.e., effects of different durations of lumbar traction in the treatment of Low back pain. In low back pain conservative management such as lumbar traction, strengthening training, stretching is said to be effective. However, there are no studies in the literature on the effectiveness of lumbar traction durations on low back pain. Purpose of the study is to know about the effectiveness of different durations of lumbar traction to reduce disability, and pain in patients with low back pain. **Methodology:** A total number of forty subjects who fulfilled the inclusion criteria were recruited in the study. The subjects were divided into two groups of 15 each. Group A received intermittent lumbar traction of 60 second hold with 10 second rest. Group B received traction of 80second hold with 20 second rest. 5 days a week for 4 weeks. The scores of Modified Oswestry Low Back Pain Disability Questionnaire, VAS (visual analogue scale) were used to measure disability and pain from the subjects before and after four weeks after the intervention. **Result:** Both the groups Group A and Group B showed improvements after four weeks of intervention. Group B with a longer hold and rest times i.e., 80second hold with 20second rest showed a higher statistical significance with a value ($P< 0.0001$) when measured with Modified Oswestry Low Back Pain Disability Questionnaire and Visual Analog Scale. **Conclusion:** Based on the above results group with longer hold and rest times i.e., Group B (80s hold with 20s) rest showed greater improvements in reduction in disability scores and pain in patients with low back pain when outcome was measured with Modified Oswestry Disability index Thus the present study concludes that intermittent lumbar traction with longer hold and rest times i.e., 80s hold and 20s rest(Group B) is more effective in the treatment of lumbar intervertebral disc prolapsed condition in low back pain.

KEYWORDS: Intervertebral Disc Prolapse, Intermittent Lumbar Traction, Hold and Rest time.

INTRODUCTION

Low back pain (**LBP**) is a common disorder involving the muscles, nerves, and bones of the back.[1,2,3,4,5] Approximately 80 % of all people will suffer from one or more episodes of back pain in their active life.[6,7] Pain can vary from a dull constant ache to a sudden sharp feeling.[8,9] Low back pain may be classified by duration as acute (pain lasting less than 6 weeks), sub-chronic (6 to 12 weeks), or chronic (more than 12 weeks).[10,11,12] The condition may be further classified by the underlying cause as either mechanical, non-mechanical, or referred pain.[13,14] The symptoms of low back pain usually improve within a few weeks from the time they start, with 40–90% of people completely better by six weeks.[15]

Nearly everyone is affected by it at some time. For most people affected by low back pain substantial pain or disability is short lived and they soon return to normal activities regardless of any advice or treatment they receive. A small proportion, however, develop chronic pain and disability. Once low back pain has been present for more than a year few people with long-term pain and disability return to normal activities. Interventions for the management of low back pain are wide and variable however traction has been used as a medical intervention since antiquity, traction continues to be a commonly

employed modality for treating patients with low back pain for thousands of years.[16,17,18,19,20] Spinal elongation through an increase of inter vertebral disc and relaxation of spinal muscles is assumed to be the most important of the proposed mechanisms by which traction could be effective.[21,22,23]

It is the application of forces to stretch the periarticular tissues and musculature, separate joint surfaces, reduces intradiscal pressure and retracts the herniated disc material."[24,25,26] The traction effort may be continuous or intermittent, and may be applied manually or by machines.[27;28] Traction produces a flexion moment as well as axial distraction of the lumbar spine.

If intermittent traction is selected, the maximum traction force is applied during the hold time and a lower traction is applied during the relax time.[29,30]The recommended ratio and the duration of hold and relax times depends on the patient's condition and tolerance.[31,32] In general, if intermittent traction is used for treatment of a disc problem, longer hold times, of approximately 60sec, and shorter relax time of approximately 20sec, are recommended. Letchuman et al used intermittent traction with 10s hold and 10s rest and found the treatment effective in reducing symptoms and an improvement in activities of daily living. Lidstrom in his study used intermittent pelvic traction with 4s hold and 2s rest for which traction appeared to reduce subjective symptoms of the participants in the study.[33,34]

Subjects diagnosed with inter-vertebral disc prolapsed were included in the treatment .The present study was used to compare the two different durations of hold and rest combinations of intermittent lumbar traction in the treatment of low back pain. Two groups were taken as A,B with different hold and rest combinations . After 4 weeks of duration with thrice a week of intervention post test scores of VAS, Modified Oswestry low back pain disability Questionnaire were assessed.[35,36,37]

MATERIALS AND METHODOLGY

Ethics: All the time during the period of study ethical issues were followed with utmost care and due respect towards the patients' health. All the patients will be asked for their informed consent before entering into the trail. Each patient shall be explained about both beneficial and potential harmful effects (if any) of the treatment which she was supposed to receive. The participants will be explained about the purpose of the trail. The request for termination of the treatment by the patient at any time of the study shall never be denied.
Study Design: Experimental study design
Sampling Technique: Randomly selected by coin toss method for assigning patients into two groups.
Sample Size: 30 subjects (15 in each group, Group A and Group B)
Duration: 4 weeks
Study Groups: Two - Group A Group B

Source Of Data: This study is done at 'SIMS College of physiotherapy', outpatient department Guntur. The subjects will be considered for this study only after they signed on an approved consent form.

Inclusion Criteria

- Patients with complaints of low back ache.
- Age group between 18-45 years.
- Both male and female with IVDP
- IVDP confirmed by radiography with or without radicuopathy
- IVDP less than 12 weeks duration
- Low back pain which is classified as nonspecific without any under lied patho mechanic changes.
- VAS score more than 3 on 10 point scale
- Subjects willing to participate in the study
- Low back pain for 3 months or longer

Exclusion Criteria

- Hernia.
- Vertebral fractures
- Malignancy
- previous spinal surgery
- Injuries to lower limb
- Ankylosing spondylitis
- Rheumatoid arthritis

Outcome parameters
Modified Oswestry Low Back Pain Questionnaire
VAS (visual analogue scale)

Materials used for the study
Written Informed Consent
Data collection sheet
Traction couch
Pillows &Traction belts

Procedure: A total number of 30 patients are included in the study after taking informed consent and divided into 2 Groups of 15 in each group.
All subjects were treated with similar traction apparatus and the four intervention groups were treated thrice a day for four week for 15-20 minutes per session.

Group A:
Subjects in this group received intermittent lumbar traction of 60s hold with 10s rest.

Group B:
Subjects in this group received intermittent lumbar traction of 80s hold with 20s rest.

The weight applied for traction was in range between 5 kg and 60% of body weight. Normally traction weight is increased along with the number of traction sessions. In lumbar traction therapy, several factors has to be considered. Among other (weight, number and duration of session, duration of treatment) the position of traction is of a paramount importance.

Traction mechanism help to relieve pain, separate the vertebrae, remove pressure or contact forces from injured tissue, increase peripheral circulation by a massage effect and reduce muscle spasm. The pain will be increased during the first two treatment sessions. All the patients were treated with the same traction device.

After the patients lay down on the table top in a comfortable position, traction braces were attached around the iliac crest and the lower thoracic cage. Since spinal elongation is likely to occur with a traction force above but not below 25% of total body weight.

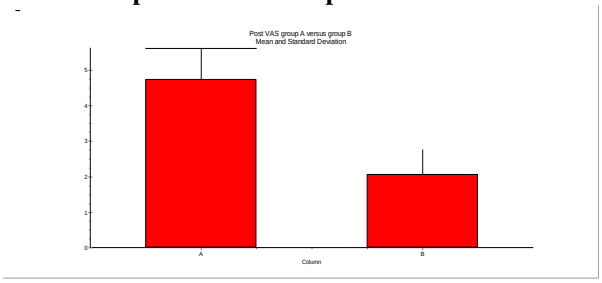
In deciding what traction weight to apply, one must consider 2 aspects (what weight will overcome friction between the body and the bed); and (what amount of force is required to exert an effect on the lumbar spine. After the completion of treatment patients were removed from the traction table using a strategy that involved rolling over their side before standing up, to reduce the loading on the spine.

	MEAN	STANDARD DEVIATION	P-VALUE	T-VALUE
PRE	4.733	0.8837	<0.0001	9.142
POST	2.066	0.7037		

After four weeks of intervention post test scores of VAS, Modified Oswestry Low Back Pain Disability Questionnaire were recorded

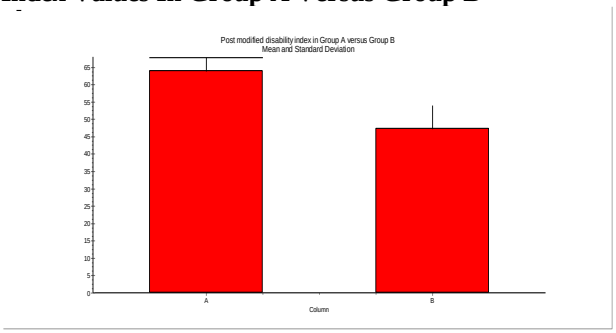
DATA ANALYSIS AND RESULTS

Vas in Group A Versus Group B



DESCRIPTION: The difference between post values measured by VAS using the two tailed P value is (<0.0001) considered extremely significant

Comparision Of Post Modified Oswestry Disability Index Values In Group A Versus Group B



DESCRIPTION

The difference between post values of modified oswestry disability index using the two tailed p value is (<0.0001), considered extremely significant.

	MEAN	STANDARD DEVIATION	P-VALUE	T-VALUE
PRE	64	3.780	<0.0001	8.427
POST	47.3	6.662		

DISCUSSION

Based on the results above it is seen that subjects in both the groups GROUP A and GROUP B showed reduction in pain and disability after 4 weeks of intervention but significant reduction in pain and disability was seen in GROUP B with 80s hold and 20s rest when compared to GROUP A 60s hold and 10 sec rest.

Pre and post treatment values of Modified Oswestry Low Back Pain Questionnaire and Visual Analogue Scale were recorded.

The reduction in pain and disability in both groups was due to lumbar traction. Traction given with 60s hold and 10s rest, 80s hold and 20s rest to relieve pain by separating vertebrae, remove pressure or contact forces from injured tissue.[37,38] It increase peripheral circulation by a massage effect, and reduce muscle spasm.[39,40,41]

Traction has the advantage of being non-invasive with a relatively low risk of injury to the patient.[42,43] According to the results interpreted in the present study it could be hypothesized that application of traction force with 80s hold and 20s rest to the spine might have caused distraction of the spinal apophyseal joints.[44] For distraction to occur the force must be great enough to cause sufficient elongation of the soft tissues surrounding the joint for the joint surfaces to separate whereas a smaller amount of force i.e., 60s hold and 10s rest will increase the tension on, or elongate only the soft tissues of the spine without separating the joint surfaces.[45,46] This might be the reason for group B to show significant improvement than group A. In conclusion , the results of this study shows that there was significant reduction in pain and disability in subjects with low back pain who are treated with longer duration of lumbar intermittent traction with 80s hold and 20s rest time (Group B) compared with subjects treated with shorter duration of traction with 60s hold and 10s rest time (GROUP A).

Hence group B is effective in reduction of pain and disability in low back pain patients with longer hold and rest seconds.

M Krause in her study stated some evidence which suggests that a transitory increase in physiological range of motion occurred with alteration of length and mobility of connective tissue structures. Separation of the vertebral bodies may provide a stretch to the spinal soft tissues that is adequate to induce a transitory increase in length.[47]

The mean values of Modified Oswestry Disability Questionnaire demonstrated a reduction after one week of intervention.[48] The paired t test results were also significant after one week of intervention ($p < 0.0001$).

The pain intensity of the subjects evaluated by VAS presented with abatement in the mean and standard deviation values from pre-treatment to post-treatment.[49,50] The results of paired t test also revealed a statistical significance in the VAS scores during the post-treatment period ($p = <0.0001$).[51]

A comparison done between two groups showed an equally significant result in group A (60s hold with 10s rest), group B(80s hold with 20s rest) and group D (80s hold with 20s rest) but group B showed more reduction in pain and disability due to its longer duration and an increase separation of vertebral bodies, mechanical separation of vertebral separation may induce neuro physiological changes that are responsible for pain reduction indicating a decrease in functional disability following traction therapy.[52,53]

Van der Heijden stated the efficacy of lumbar traction in reducing pain in the treatment of lumbar IVDP. He concluded that neurological deficits associated with radicular pain are thought to arise from mechanical compromise, inflammation and ischemia of the spinal nerve root which resolved after the application of high force traction.[54] i.e., 80s hold time and 20s rest time

It could be contemplated that pain reduction due to high force traction with longer duration was probably due to stretching of the soft tissue structures and increase joint mobility which in turn stimulated the mechanoreceptors and thus reduced pain by gating the afferent transmission of pain stimuli.

CONCLUSION

In conclusion , the results of this study shows that there was significant reduction in pain and disability in subjects with low back pain who are treated with longer duration of lumbar intermittent traction with 80s hold and 20s rest time (Group B) compared with subjects treated with shorter duration of traction with 60s hold and 10s rest time (GROUP A). Hence group B is effective in reduction of pain and disability in low back pain patients with longer hold and rest seconds.

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