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IMPACT OF SPINAL DECOMPRESSION ON PAIN IN PATIENTS WITH CHRONIC LUMBAR DISC PROLAPSE

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ABSTRACT

Background: DRX9000 spinal decompression is slightly known for treating chronic lumbar disc prolapse. The aim of the study was to examine the effectiveness of DRX9000spinal decompression on pain in chroniclumbar disc prolapse (CLDP).

Methods: twenty male subjects with chronic lumbar disc prolapse,aged between 40:60 years were included in the study. They were assessed forpain intensity byslump test, straight leg raising test (SLR),modified Oswestery questionnaire (OQ) and visual analogue scale (VAS). The study continued forsix weeks, the 20 patients were equally divided into two groups. Group A (experimental) received spinal decompression, stability and McKenzie exercises; and ice, at a rate of 3 days per week, the duration of each session was 60 minutes. While group B (control) were treated by exercises and ice only.

Results: Majority of patients had positive findings in reducing pain clinically; however, statistically there was no significant difference.

Conclusion: It can be concluded that spinal decompression has an effect, but not statistically significant in decreasing pain on patients with lumbar disc prolapse. This may be due to limited number of patients. We can recommend increasing the sample size to generalize the results, MRI scan follow up should be done after one year to determine if the effects are permanent or transient, comparing the effects of decompression between acute & chronic cases of lumbar disc prolapse, also male & female patients.

Keywords: DRX9000spinal decompression, chronic low back pain, lumbar disc prolapse, exercises.

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INTRODUCTION

Chronic lumbar disc prolapse (CLDP) is a condition that causes severe low back pain that may limit the motion in the lumbar region. It is a problem leading to decreased muscle strength and impaired motor control, decrease coordination and postural control.¹ Low back pain (LBP) is one of the great human complaints. Almost anyone these days has a greater chance of suffering a disabling back injury regardless of occupation.¹ LBP is one of the most frequent disorders of the musculoskeletal system. It may result from a disc prolapse and compression of the nerve root, which can cause pain and other symptoms in the leg.²

Once a person is diagnosed with lumbar disc prolapse, various treatment methods have been advised, including non-steroidal anti-inflammatory painkillers, hot packs, Ice packs, massage, ultrasound, LASER, McKenzie exercises, stability exercises, traction and decompression (DRX9000). Traction is a mobilization technique for the spine and para-spinal muscles and a method to assist in negating the effects of gravitation and compression on the spine.³ Specifically, DRX9000 is a new, computerized traction device for treating pain caused by disc prolapse. It is a non-surgical procedure designed to alleviate pressure on the anatomical structures that cause low back pain.³

Disc Prolapse is a localized displacement of disc material beyond the limits of the intervertebral disc space. Displacement of disc material can thus only occur when there is a disruption of the annulus fibrosis, or a break in the vertebral body endplate. The disc material may be nucleus, cartilage, fragmented epiphyseal bone, annular tissue, or any combination thereof.⁴

When a large asymmetric force is applied to a healthy young disc, a disc protrusion or prolapse (herniation) can occur. Acute trauma may produce disc prolapse whether or not there is degeneration, but disc prolapse in absence of acute injury requires the presence of preexisting degenerative change.⁵

Lumbar disc herniation or prolapse is the most common disorder in the spine, occurring in 2% of the general population. Around 56% of adults have disc bulging, MRI scans show that between 20-35% of working age adults have asymptomatic disc herniation. In addition 80% of general population will experience back pain but only 2-3% will have sciatica. The majority of lumbar prolapse occur at L4-L5 or L5-S1 spinal levels.⁶

Patients with lumbar disc prolapse complain from low back pain, radiculopathy with leg pain. After a

time, the pain may begin to radiate into hip, buttocks, or legs and may include paresthesia or weakness. Commonly, the sciatic nerve is the most affected nerve, causing symptoms of sciatica. The femoral nerve can also be affected and cause the patient to experience a numbness, tingling, or burning felling throughout the limb or both hips, legs and even feet.⁷

Low back pain patients are more mentally distressed. Self-reported symptoms of somatization, anxiety, phobic anxiety, obsessive-compulsive, depression and hostility are all more common among patients with low back pain compared to the general population.⁸

Treatment

Physical Therapy:

- Application of a variety of modalities, such as heat, ice, pulsed ultrasound, LASER and TENS to reduce pain. As pain improves, specific exercises to increase the flexibility, strength the back and abdominal muscles, and improve the posture to be applied. Regular use of these techniques will help prevent pain from recurring.⁹
- **Ice application:** Prolonged ice application promotes constriction of blood vessels (vasoconstriction), hence it used to decrease inflammation, pain and spasm.¹⁰
- **Exercises:** Strengthening abdominal and spinal muscles can help prevent back problems (McKenzie exercises, bridging exercises, exercise to strengthen transverse abdominus muscle). If the back and abdominal muscle are strong, it will help to maintain a good posture and keep the spine in its correct position.¹¹

DRX9000 Decompression Machine:

The DRX9000 non-surgical spinal decompression machine is created to provide relief of back pain and symptoms associated with prolapsed disc and sciatica.¹² The decompression process has been proven to relieve pain by enlarging intradiscal space, reducing prolapse, strengthening outer ligaments to help move prolapsed parts back into place. Moreover, reversing high intradiscal pressure through application of negative pressure.¹³

Subjects, Material and Methods

Subjects: Twenty male subjects with lumbar disc prolapse aged between 40:60 years, were recruited from the outpatient clinic at Abdul-Latif Jameel Center for Rehabilitation and Health Care. They were randomly & equally divided into two groups, group A(experimental) and group B (control).

Inclusion criteria: all subject with lumbar disc prolapse fulfilled the following: patient with chronic lumbar disc prolapse, males, referral from orthopedists with MRI report; and average age between (40-60 y).

Exclusion criteria: patients with spinal instability, vertebral fracture, spinal cord compression, caudaequina syndrome, history of prolonged use of corticosteroids, advanced osteoporosis, metal spinal implants, systemic connective tissue disorders, malignancy, systemic anticoagulation, local infection, pathology or nerve injury, previous spinal surgeries, abnormal laboratory findings, psychiatric illnesses, hiatal hernia, claustrophobia, and spinal canal stenosis.

MATERIAL

Slump Test: Every patient was seated on the edge of the treatment plinth; then was asked to put his hands behind his back; finally "slump" his back forward. While this position was hold, he flexes his neck and head. Then, the therapist hold the subject's foot in dorsiflexion position and ask the patient to actively straighten the knee as much as possible. The test is repeated with the other leg and then with both legs at the same time. If the pain is increased, then the test is positive.⁹

Straight Leg Raising Test (SLR): The subject is totally relaxed in supine position, and the therapist tests each leg individually starting with the normal leg. The therapist raises the subject's leg passively until the patient feels pain in the back or in the back of the leg. The therapist will lower the subject leg slowly until the patient pain decreased; then the therapist dorsiflexes the patient's foot. If the pain increased, the test is positive.⁹

Visual Analogue Scale (VAS): VAS is a measuring tool that tries to measure pain attitude that is believed to range across a continuum of value from no pain to maximum pain and cannot easily be directly measured.¹⁴

The Oswestry Questionnaire: OQ is a disability index based on ten questions, each followed by six alternatives. Each question is scored from 0–5, and the sum of the scores is then expressed as a percentage.¹⁵

METHODS

The two groups were assessed before and after the treatment according to pain intensity of the lumbar area by using the VAS and OQ. Ten subjects (group A) received traditional physical therapy program including stability exercises (bridging and transverse abdominus exercise), McKenzie exercise, and ice back, plus the Decompression treatment. They received 20sessions distributed

per 6 weeks. The duration was 60 minutes for each session. The control subjects (group B) received traditional physical therapy program only. They received 20sessions distributed per 6 weeks. The duration was 30 minutes for each session.

DRX9000 Treatment Protocol

The angle for treatment was set according to MRI findings as written in the doctors' referral to target certain level of lumbar disc. Number of treatment sessions is 20 time per 6 weeks. One treatment is equivalent to 28.15 minutes comprising of 18 cycles\ session. One cycle is equivalent to 60 seconds maximum pull and 30 seconds minimum pull.

The treatment program consists of four phases: Phase 1: 5x/wk for 2 wks, the patient was instructed to restrict any activity that compresses the disc. Phase 2: 3x/wk for 2 wks, stretching, ROM, isometric exercises for the back muscles. Phase 3: 2x/wk for 2 wks, spinal stabilization exercises for the back muscles. The subjects were taught some exercises at home, but they were instructed to still limit any activity that compresses the disc. Phase 4: subjects were instructed to exercise at home for 6-8 weeks. After 6-7 months of treatment, another MRI for comparison should be done. Subjects were treated for 30 minutes with ice application for 20 sessions.^{3, 12,13,16-19}

Statistical analysis:

Data analysis was done using the statistical package for social sciences (SPSS) version 16 (SPSS Inc., Chicago, Illinois, USA). Participants' data were presented by descriptive statistics as means, standard deviations, and percentages. Paired T-Test was used, at 0.05 significance level.

RESULTS

VAS: According to VAS, the results revealed a non-significant difference between the study and control groups before intervention (p=0.349). While after intervention, there was reduction of pain there was reduction of pain observed in study group more than control group clinically but not statistically significant (p=0.065) as shown in table 1.

Table1: Comparison between mean values of study and control groups as regard to VAS pre and post treatment.

VAS	Study Mean ± SD	Control Mean ± SD	P
Pre	7.50 ± .70	7.75 ± 1.40	0.349
Post	2.62 ± 2.14	4.97 ± 3.22	0.065
P	0.799	0.113	

Oswestry Questionnaire: The results revealed a non-significant difference between the study and

control groups before intervention ($p=0.059$). After intervention, there was a significant decrease of pain in both groups ($p=0.025$), as shown in Table (2).

Table 2: Comparison between the study and control groups as regard to Oswestry pre and post treatment.

Oswestry	Study Mean \pm SD	Control Mean \pm SD	P
Pre	56.00 \pm 79.67	54.00 \pm 10.90	0.059
Post	16.00 \pm 12.34	33.75 \pm 21.88	0.025
p	0.765	0.515	

SLR and Slump Test: Before treatment, there were 80% of patients suffusing from sciatica in the study group, and 10% of the control group. While After treatment, 60% of the study group had been completely cured, as well as 10% of the control group as shown in Figure (1).

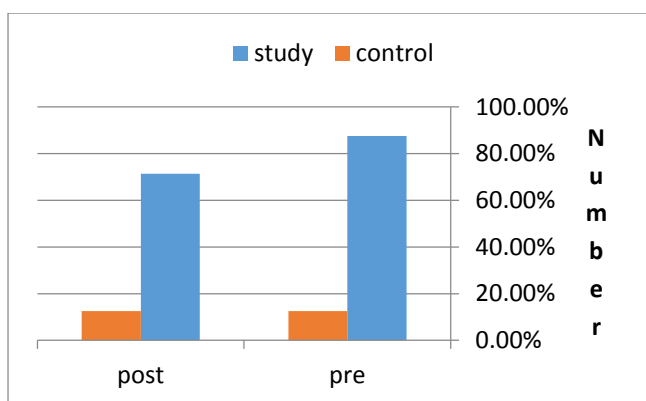


Figure 1: Comparison between groups in number of subjects with sciatica pre and post treatment.

DISCUSSION

DRX9000decompression system is a device that can be used for LDP pain-inhibition, provide general relaxation and mobilize the spine mechanically to decrease pressure effects and nerve and muscle irritability.¹³ The results of the present study revealed positive findings in reducing pain clinically, however, statically, there was no significant difference between the study and control groups. In accordance with our results, it is reported that 86% of ruptured intervertebral disc (RID) patients achieved 'good' (50-89% improvement) to 'excellent' (90-100% improvement) results with decompression. In addition sciatica and back pain were relieved.¹⁶

Vertebral axial decompression therapy is used for pain associated with herniated or degenerated discs or facet syndrome. Data was collected from 22 medical centers for 778 patients. The treatment was successful in 71% of the 778 cases, when success was defined as a reduction in pain to 0 or 1

on a 0-5 scale. Patients who received vertebral axial decompression (VAX-D) therapy for low back pain, which was sometimes accompanied by referred leg pain.¹⁷

A study on 219 patients with herniated or degenerative disc disease showed that using DRX9000, spinal decompression was found to relieve symptoms and restore mechanical function and normalized the ROM in 86% of patients previously thought to be surgical candidates[18]. Non-surgical spinal decompression was associated with a reduction in pain and an increase in disc height. The correlation of these variables suggests that pain reduction may be mediated, at least in part, through a restoration of disc height.^{19,20}

All the previous researches found a statistically significant difference compared with the present study. This may be due to the small sample in this study as well as limitation of time.

CONCLUSION

As regard to the positive effects in pain reduction, we found that the decompression is effective in reducing pain in patients with lumbar disc prolapse in the study group more than the control, but were not statistically significant, as regard to our result. This could be due to the small sample size.

Recommendations: The following suggestions are recommended:

- Further study including female subjects to be done for comparison with male results.
- Performing the study on different areas in the kingdom for generalizing the results.
- MRI Scan follow up after one year of the treatment to determine if the effects are permanent or transient.
- Comparing the effects of decompression on acute versus chronic cases of lumbar disc prolapse.

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