

## Case Report

# MULTIMODAL PHYSIOTHERAPEUTIC APPROACH IN TREATING A PATIENT WITH ACUTE CERVICAL DISC PROLAPSE

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## ABSTRACT

**Background and Purpose:** Cervical disc prolapse is one of the leading cause of morbidity and affecting the patients routine work of their ADL. Due to severity of symptoms and patients feeling of insecurity, physiotherapeutic conservative approach is questionable and has become challengeable against surgery. The purpose of this case report is to explore the efficacy of multimodal physiotherapeutic approach in treating a patient with acute cervical disc prolapse.

**Case Description:** 33 year old male patient was diagnosed with acute cervical disc prolapse and the pain was radiating to the right upper limb associated with numbness. The patient was given initially physiotherapeutic modalities like cryotherapy, ultrasound and mechanical traction to reduce pain. Muscle Energy Technique was also implemented for initial days along with cryotherapy based on cryokinetics concept to enhance movements of cervical spine. Mckenzie exercises with appropriate techniques was administered for 10 days along with retraction exercise, basic ROM and neck isometrics as a home program. The patient received treatment for a period of 12 days.

**Outcome Measures:** The outcome measures used were Numeric Pain Rating Scale, Neck Disability Index, Tampa Scale for Kinesiophobia, and Cervical ROM.

**Conclusion:** Multimodal physiotherapeutic approach along with Mckenzie technique played a significant role in alleviating pain, numbness and improvement of the patient functionally for return to his normal work.

**KEY WORDS:** Cervical disc prolapse, Physiotherapeutic modalities, Mckenzie approach, Neck Disability Index, Numerical Pain Rating Scale, Tampa Scale for Kinesiophobia, Cervical ROM.

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## INTRODUCTION

Neck pain is a common health issue which is always accompanied with marked disability in the general population [1]. Most individuals with neck pain do not have a complete resolution of their pain and disability. Besides the subjective distress, the pain may cause absenteeism from work and cause subsequent loss to society financially. Thus, neck pain is a disabling condition with a course marked by periods of remission and exacerbation and thus considered

a chronic health condition [2,3].

Intervertebral discs are structures present in between the spinal vertebrae from the neck to the sacrum. The discs absorbs stress which is introduced into the spine and allow six degrees of freedom in which the largest motion present is in sagittal plane (flexion/extension) [4]. One of the commonest problem seen in discs are disc herniations, which are abnormal protrusions of a portion of the disc material [5].

The herniation of an intervertebral disc can have varied effects depending on the amount of disc protrusion. If the disc protrudes as much it may impinge on a spinal nerve as it exits the vertebral column; this impingement may result in symptoms which are radiating into the peripheral extremities depending on the level of the herniation. Cervical disc herniation generally occurs when flexion, extension, rotation, and their combination exceeds the strength of the annulus fibrosis and the supporting anterior and posterior ligaments. It has been found that Cervical flexion provides the most compressive force on the disc.<sup>6</sup> With the combination of these movements, it increases the amount of pressure on the disc and invariably increasing the chance of a disc herniation [4].

The most common area to have a disc herniation is in posterior lateral direction, this is due to the posterior longitudinal ligaments being relatively weak compared to the other structures containing the disc [7]. There are seven vertebral bodies in the cervical spine. The most common levels of cervical disc herniation are C5-6 and C6-7, which account for about 90% of all cases [8].

The McKenzie method was introduced in Sweden in 1985 and came to be frequently used in the 1990s as a treatment modality among patients with mechanical problems of the spine [9]. Today, physiotherapists in primary care often employ this procedure both as diagnostic tool and a treatment model. The method has a highly trust among physiotherapists, but there is less concrete scientific evidence that McKenzie treatment is effective for patients with neck pain [10]. Even though many manual therapy approaches reduces the cervical dysfunction, electrotherapeutic agents also plays a significant role in reducing pain and it takes the patient for further assessment and allows the patient for doing manual therapy techniques.

Very few literatures are found as a multimodal approach including manual therapy techniques and electrotherapeutic agents in alleviating the pain and improvement in cervical disc prolapse patients. Thus the purpose of this case report is to present the non surgical management of a patient with acute cervical disc prolapse by

McKenzie approach as a main form of treatment in combination with other physiotherapeutic modalities.

**Patient Characteristics:** A 33- year-old male came with stiff neck with unbearable pain, 10/10 on Numeric Pain Rating Scale (NPRS) which was radiating to the Right upper limb associated with numbness. He was not able to turn even for few degrees and was diagnosed as having acute cervical disc prolapse at the level of C5-C6 in a Hospital and was told him most likely to go for a surgery, also he was told by the surgeon to try with physiotherapy. Then the patient approached to our Hospital and was referred to physiotherapy department through orthopedician surgeon. Upon taking history, the patient reported he was into the mobile continuously for nearly about three hours, also he was using 3 pillows in an awkward position and slept off. He recalled his neck to be in a flexed and slightly right rotated position. MRI result confirmed the diagnosis of cervical disc prolapse at the level of C5-C6. Aggravating factors included coughing, initiation of neck flexion and rotation to the right. The patient reported a disturbed sleep pattern. The patient entered the physiotherapy department with agony and was wearing a cervical collar. The neck pain which was radiating to Right side upper limb was severe and the patient was not able to move his neck in any direction.

**Examination:** Informed consent was obtained from the patient. The NDI was administered followed by a subjective interview (including NRPS) and an objective physical exam which includes postural screening and documented as having forward head posture, however due to severe pain a complete physical examination couldn't be able perform. The pain was in the neck and it radiated to the Right side upper limb associated with numbness throughout the limb till his hands. It was also found that there were reduced deep tendon reflexes of biceps and brachioradialis. There was diminished sensation on the Right side of lateral aspect of shoulder, arm, forearm, 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> digits when sensory examination was performed. Motor examination revealed the patient had weakness in moving the Right upper limb and couldn't do efficiently because of pain. As physical examination was

not able to perform fully, attention was given to reduce his pain as the patient was in agony.

**Intervention:** Patient was made to lie in supine carefully because even very less movements increased his pain abruptly. Ice packs were applied on his neck for about 10 to 15 minutes until the patient felt numbness in the neck region and after that slow neck rotation to right and left was encouraged carefully based on cryokinetics concept. Muscle Energy Technique was administered carefully for improving neck rotations and lateral flexions.

Ultrasound was given for about 5 minutes over the paraspinal muscles in cervical region, after that cervical traction was administered to the patient for about 15 minutes. The same procedure was done on day 2 and it was found that the pain has come down little.

On day 3 after reduction of pain, grip strength was assessed manually and found that it was reduced compared to normal side. Motor examination revealed reduced strength (4/5) in biceps, deltoid and extension of wrist. Assessment findings indicated neck extension caused the centralization of symptoms and flexion peripheralized the symptoms, and therefore the initial phase of care was in favour with extension. Flexion exercise was initially avoided. The initial procedure was chin tuck or retraction exercise. Mckenzie exercises were started initially in supine position. Patient was in supine position and was asked him to do retraction with assistance. This was repeated at a frequency of 10 to 15 times for 3 sets with PT over pressure applied and also according to the patient tolerance. The chin tuck (retraction) exercises were taught in sitting position, in which the patient made to sit upright in a comfortable position maintaining the lumbar lordosis which helps in achieving maximal cervical retraction. As Retraction with extension was painful to the patient it was not encouraged on day 3.

The Mckenzie's retraction exercises were continued for rest of the days. On successive days of treatment patient felt better and ROM of cervical movements increased. On day 7 as pain was reduced, physical examination was done including ROM. Upon examination it was found that numbness in the Right arm turned

into sensation of pins and needles. Also he gained his normal sensation in the upper arm, even though sensations of pins and needles were found below elbow throughout the extremities. The patient removed his cervical collar and he felt that he has gained the stability of neck. The fear came down in accordance with TSK as the patient got confidence in his ADL.

On day 8, retraction with extension exercises were taught to the patient with assistance. After retraction and extension, rotation component was added to either sides and was encouraged to do carefully. Mckenzie retraction exercises in supine lying, sitting and retraction with extension combined with mini rotations was continued from day 8. The patient was positioned in supine lying and manual traction was given along with retraction and extension. The same procedure was administered to the patient throughout phase III.

The individual was told to avoid forward head or chin poking posture and perform home exercise. The patient was told to pull his head and neck posterior into a position in which the head was directly over the shoulder girdle, while the head and eyes remained in level. The end position was to be maintained for one second and then allowed to relax into a resting posture. As above mentioned Mckenzie retraction exercise was given as home program for the patient to do at home for 3 sets of 5 repetitions twice a day. On day 12, it was found through sensory examination that pins and needles disappeared, thus patient regained normal sensations, muscle power & reflexes appeared normal, also the patient felt grip strength was functionally equal to that of normal side. The patient was free from fear during his ADL in accordance with TSK, also it was found that pain level had come to 0, neck disability score went down and patient attained full ROM. The patient felt more confident and was able to do his work normally. All of these factors were measured by outcome measures which were evaluated by the last day of each phases.

Patient walked away from the department without getting into surgery and asked him to continue Mckenzie exercises, basic ROM exercises, neck isometrics to strengthen the muscles and lessen the chance of recurrence.

He was also taught about postural awareness and to maintain proper neck mechanics.

6 week follow-up was done through phone and patient was re-examined and found that he was absolutely normal including motor, sensory and reflex component without any recurrence of symptoms. Therefore this case report could play a substantial role in serving as a multimodal physiotherapeutic approach among patients with cervical disc prolapse.

**Fig. 1:** MRI showing C5-C6 disc prolapse.



**Fig. 2:** Assisted self retraction.



**Fig. 3:** Manual Traction-Retraktion in Extension.



**Fig. 4:** Sitting Retraction-Extension.



The interventions given to the patient has been divided into phases and listed below along with outcome measures used

**Table 1:** Interventions and Outcomes.

PHASE	INTERVENTION	NRPS	NDI	Cx ROM	TSK
<b>I Day 1&amp;2</b>	Cryotherapy- Cryokinetics, Ultrasound, MET, Traction	10- Day 1 9 -Day 2	28	Day 1- Unable to assess Day 2- 5° in all directions	>37 62
<b>II (5 days) 3-7</b>	McKenzie retraction exercise in supine and sitting, Ultrasound & MET (for 3 days), Traction	5	14	Flexion 0 - 30 ° Extension 0-40 ° Lateral flexion Rt 0- 30 ° Lt 0-35 ° B/L Rotation 0-60 °	>37 34
<b>III (5 days) 8-12</b>	Phase II (Mckenzie retraction in supine, sitting & Traction) Plus McKenzie retraction, extension combined with rotations & Manual traction, retraction along with extension	0	4	Normal ROM	<37 28

## DISCUSSION

Many times surgery has been used as a last resort option for cervical dysfunctions and many go ahead for surgery especially for disc prolapse. In our case also the patient had a plan for the surgery if conservative treatment fails. Conservative treatment is most widely used to treat cervical dysfunctions and is generally believed to ease the symptoms of disc prolapse. One of the most popular approaches used and believed by physical therapists in case of disc herniations is McKenzie approach.

Previous studies have proven McKenzie exercises helps in alleviating pain and recovery in disc prolapse patients. Even though recent manual therapy techniques emphasizes on targeting to cure the cause, electrotherapeutic modalities also plays a significant role in reducing the symptoms like pain, muscle spasm immediately so that the physiotherapist can implement the manual techniques efficiently. Most of the earlier studies have done with either comparing the manual therapy techniques or emphasizing on specific technique in alleviating the patient's condition. But in our case report we have focussed practically for enhancing the patient's condition by using a multimodal physiotherapeutic approach which included manual therapy techniques emphasizing on McKenzie Techniques, Muscle Energy Techniques and other electrotherapeutic modalities.

Ultrasound when applied in pulsed mode with low intensity helps in resolving inflammation and reducing pain. The pulsed mode when applied at low intensities produces non thermal effects which modulates the inflammation, as well as reduces the conduction velocities of transmission of noxious impulses through the nociceptors due to alterations in sodium potassium ATPase pump activity [11]. In our study also the patient got relieve from pain in the initial days and ultrasound was given for 5 days with low intensity of pulsed mode.

Cryotherapy is seems to be an effective pain relieving tool for all acute injuries to get relieve from pain and acute inflammation and in our study cryotherapy was used for initial 2 days along with cryokinetics concept for encouraging neck movements [12].

Cervical traction has been used worldwide in relieving neck pain from muscle spasm or nerve compression in rehabilitation settings. Several studies have discussed about the reduction of disc prolapse using traction as it widens the disc space [7,8].

Muscle Energy Technique is used most commonly and clinically by physical therapists to restore the range of motion in vertebral segments of spine. MET can be used to lengthen the muscles which are shortened, contracted or spastic [13]. In our study MET was used for initial 5 days to improve the ROM by relaxing the cervical muscles only in cervical rotations and lateral flexion because flexion aggravated the symptoms and extension was focussed by McKenzie approach. McKenzie exercises plays a substantial role in case of management of disc prolapse. The McKenzie method of care has been successful in the treatment of neck pain in the short term [10]. It divides conditions into three syndromes based on symptoms and their response to loading, postural, dysfunction and derangement syndromes. In our case report the patient comes under a derangement category.

The McKenzie system of diagnosis and treatment promotes a more active patient-directed approach. However, the methodology tends to be simplistic, McKenzie shall be added in a Physical Therapist protocol for successfully treating any neck pain patients with radiation to the upper limbs. In our study the patient was instructed to do the McKenzie exercise in both supine lying and sitting position, in sitting position the lumbar lordosis was maintained as this helps in achieving maximum cervical retraction and retraction with extension in end range loading. In this position the patient was asked to do retraction exercise and retraction with extension added with rotations [14].

Neck retraction, which has been implemented by McKenzie in the treatment of the derangement syndrome, causes extension of the lower cervical segments and this in turn may reduces the stress on the posterior annulus, thus the pain is relieved [15]. In our study we added cervical manual traction with retraction and extension which played a significant role in the patient's recovery. This maneuver was implicated in phase III for last five days for the patient. This proce-

-dure is based on the appropriateness of centralisation and peripherisation and also patients feedback is essential in determining the rotation and extension range [14].

Even though multimodal treatment approach was effective in the rehabilitation of cervical disc prolapse, Randomised trials may be required in future research for concluding the efficacy of individual treatment approach in alleviating symptoms and patients recovery.

## CONCLUSION

Based on our case report acute cervical disc prolapse patients can be treated efficiently by various physical modalities and manual therapy techniques after doing a complete physical examination. Thus a multimodal Physiotherapeutic approach helped the patient to get back to his normal ADL and to the work.

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