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Evidence Based Physiotherapy Management of a Case with Cervical Radiculopathy Using Clinical Reasoning Process: A Case Summary

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Abstract: *Background: Background:* Neck pain can be caused by different pathology that can affect patients' day to day life due to pain and reduced ROM. The process of making professional decisions before, during, and after treatment in physiotherapy is known as clinical reasoning, and it is seen as a crucial part of physiotherapy practice for physiotherapy professionals. *Aim:* The aim and objective of this study is to describe a solo case with cervical radiculopathy with appropriate assessment and evidence-based treatment, also evaluating the outcome of the treatment process therefore establish the effectiveness of advance physiotherapy in this case. *Method:* A case study of typical cervical radiculopathy managed by using clinical reasoning process and advance evidence-based physiotherapy treatment to reduce pain, increase ROM, improve functional ability and ADL's. *Result:* Pain was noticeably reduced, and range of motion had improved and changes in disability status with neck disability index by the end of the six-week therapeutic strategy. Patient can now participate in daily activities without any limitation. *Conclusion:* This case study states that evidenced based physiotherapy is beneficial for cervical radiculopathy. In addition, application and clinical reasoning process can be useful and cost effective.

Keywords: Cervical Radiculopathy, Hypothetico Deductive Reasoning, Neck Disability Index

1. Introduction

Among the musculoskeletal disorder, the neck is the second most common after low back pain suffered by the mass population with musculoskeletal pathology [1]. With an annual prevalence rate of more than 30%, neck pain is the fourth most common disability. The majority of acute neck pain episodes will go away with or without therapy, however about 50% of people will continue to feel pain or encounter them frequently [2]. According to literature statistics shows that there to five people out of ten people experiencing neck pain every year and more than 60 percent of the population experiencing neck pain at a certain period of life. Where half of the people will not have full recovery of symptoms that have chronic neck pain [3].

Clinical reasoning occurs throughout the professional carrier of a practitioner which is an integration of cognitive thinking and decision-making process of health professionals [4]. Clinical reasoning is a process where therapist deals by interacting with the patient and related parson and facts (for example their family member and health care provider like the doctor, consultant, etc.), multi-disciplinary team goal, management or organization strategic plan base clinical report and the data provided by the patient, client choice and professional judgment, knowledge, and experience. Clinical reasoning enables a practitioner to reach the best possible conclusion for the betterment of patient health despite the dilemma of several facts and situation that's why it is called a wise decision [5]. The current study aims to explore the understanding of clinical reasoning by solving a single case of cervical radiculopathy.

2. Brief About Case

This case is about 47 years old leady. She is a housewife. She came to the physiotherapy department with her daughter as her husband staying abroad. Her chief complaint was pain, weakness, and numbness radiating her right arm and some forearm and difficulty in daily living activity for 3 months. Initially, it was localized and tolerable but gradually it became worsen and now she has difficulty is sleeping. She took medicine prescribed by a general practitioner, but it was only symptomatic relief for a short time. Now she is advised by her one-relatives who is an ex-client of CRP to receive physiotherapy.

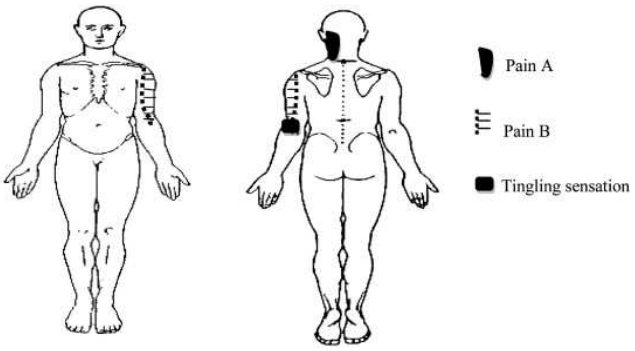

Figure 1. *Body chart.*

3. Baseline Assessment

Client came to clinic with the complaint of pain, weakness and mild numbness was her impairment that caused by anatomical and body function restriction. She was not able to maintain her activity of daily living due to her disability. She had also limited her social participation like attending the social program, tour, etc.

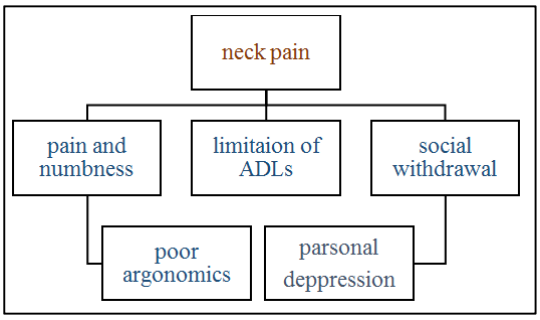

Figure 2. *International classification of functioning, disability, and health.*

As impairments in body structure and functions, patient came for treatment complained of intermittent severe radiating pain and mild numbness at her right upper limb for about 3.5 months that day by day increases. She also noticed that her pain as like as electric shock which made her life miserable. During assessment, her pain at the right side of the neck and severe radiating at the lateral aspect of the forearm and intermittent mild numbness at the thumb and index finger. According to VAS scale, resting was 8 out of 10 and mild decrease range of motion of cervical right-side rotation, side bending and flexion. There is no muscle wasting as well as reflex also normal. The activity limitation include pain aggravated by household activities such as washing clothes, cooking, and watching TV program. She also faced participation restriction as like social gathering, family program. Her environmental factor was poor ergonomics set up of kitchen, place of TV and her daily activities. In addition, her husband was not interested to come with him in physiotherapy center also felt disturb due to long time of pain. All of these difficulties and situation make him depressed, worried and less confidence. Her neck disability index (NDI) was 41%, which indicates severe disability.

4. Hypothetico Deductive Reasoning

As this was a complex case to detect initially, clinician carried out diagnosis and management plan systematically. Even though the clinician has minimal non-propositional information about the case but with adequate propositional knowledge the clinician managed to treat the patient.

4.1. Cue Acquisition

Initially patient was asked many questions and gathered answer to find out the best possible clue that related to this case. Those questions given below:

1) Is the pain constant, intermittent, and early morning stiffness & sleep disturbance? The reason for asking this question to identify causes of pain such as mechanical, non-mechanical, pathological involvement or any kind of arthritis.
2) Is the pain gradual or sudden onset and unilateral or bilateral referred?
   The intendant to ask this question was to detect the source of symptoms.
3) Which activities aggravate or relieve your symptom?
4) Which site are you fell pain at first?
   These two questions asked for to identify the exact which structure is involved and to see the severity of symptom.
5) Can you explain me your nature of pain such as burning, tingling, dull-aching, electric shock & lancinating like?
   This question asked to understand the characteristics and nature of pain so that can be easily distinguish between somatic, visceral or radicular pain.
6) Does your pain influence by cough, sneezing or deep breathing?
   This question asked to see the relationship with dural involvement.
7) Any sequence of trauma or fell disturbance during walking?
   This question asked to find out any cord compression.

4.2. Hypothesis Generation

Hypothesis generation was vital part of the systematic problem-solving process. It was an inductive reasoning, which provides a set of specific observation to a

generalization. After cue, acquisition and getting the answers few hypothesis enerated in the clinician mind, which are given below:

There may have an association of pathological cause due to early morning stiffness and sleep disturbance influence this hypothesis.

Thoracic outlet syndrome may be another reason, intermittent numbness at her thumb and radiating pain at right forearm indicates this hypothesis.:

Cervical spondylosis may have strong relationship of symptom. Patient's age, gradual onset and radiating pain may have probabilities this hypothesis.

Cervical discs prolapse with C6 radicular symptom may be main pain generator source. Pain on coughing and intermittent unilateral symptom such as numbness, radiating pain. In addition, pain characteristics was electric shock like and lancinating type pain according to the dermatome distribution. All these provocative this hypothesis.

4.3. Cue Interpretation

It involves in appropriately evaluating which cues are most relevant to the specific hypothesis under consideration. According to evidence a three-point scale for cue interpretation where '+1' cue confirms hypothesis, '-1' disconfirms hypothesis and '0' cue does not contribute to hypothesis [6]. The cue interpretation is given below.

1) Patient had no significant weight loss, pyrexia, systemic illness and pathological report. In this way the hypothesis of pathological involvement disconfirms (-1).
2) Even though, there is radiating pain at the lateral aspect of the forearm and thumb, the Adson's test (specificity 87% and sensitivity 94%) was negative and X-ray do not show any cervical rib [7].
3) The radiological findings do not show any degenerative change such as osteophytic formation, intervertebral discs space. These finding exclude the possibilities of cervical spondylosis.
4) The Dural symptom (pain on coughing) was positive. Clinicians perform Spurling test (40%-60% Sensitivity, 85%-95% specificity) by lateral flexion and rotation to the affected side with axial compression of the head reproduces radicular pain and found positive. Clinician also performed neck distraction test (40%-50% Sensitivity, 90% specificity) and found relief of radicular symptoms when grasps patient's head under occiput and chin and then lifts, applying axial traction [8]. Examiner also noticed that her pain location according to the C6 nerve root that means pain at the neck, lateral aspect of the forearm and first and second digit. Examiner also performed upper limb tension test (ULNT1) for C6 symptom, and this test done by shoulder depression, shoulder abduction 110°, wrist and finger extension, shoulder lateral rotation, elbow extension, contralateral lateral flexion of the cervical spine where the sensitivity of 0.97 and a specificity of 0.69 [9]. Moreover, active range of motion of cervical ipsilateral rotation, lateral flexion decreased. Conversely, Babinski sign was negative. All of these cues strongly confirm the hypothesis no IV (+1).

4.4. Hypothesis Evaluation

The final stage of hypothetico deductive approach was hypothesis evaluation. assessing up the advantage and disadvantage of each possible explanation for patient's sign and symptom and choosing the favored one by the evidence. After completion of all ideas, hypothesis number IV support the evidence. Thoomes et al. (2018) stated that although radiculopathy and radicular commonly occur together, radiculopathy can occur in the absence of pain, and radicular pain can occur in the absence of radiculopathy. Radicular pain is usually caused by compression of the nerve root due to cervical disc herniation. The pain quality was lancinating and electric shock like which is radicular pain.

A double blinded randomized clinical trial (RCT) to find out the efficacy of neural mobilization with manual cervical traction (NMCT) for reducing cervical radiculopathy patient's pain. They found significant difference between control group and experimental group and suggested that NMCT can pain relief and increase range of motion. Experimental group received manual cervical traction simultaneously with neural mobilization and conventional physiotherapy and control group received manual cervical traction along with conventional physiotherapy [10].

5. Intervention

I have started intervention with the Mckenzie Mechanical Diagnosis and Therapy (MDT) of cervical spine. Then neural mobilization with manual traction, cervical stability training and postural reeducation. The description of these interventions is given below.

Table 1. *Intervention.*

Physiotherapy intervention	Brief about intervention
Patient education	Posture correction written advice paper and workload management.
McKenzie approach for cervical spine	Repeated extension in lying with 10 repetition 2 hourly [11].
Neural mobilization with cervical traction (NMCT)	Two physiotherapists in lying position gives simultaneously manual spinal traction and neural mobilization. Neural mobilization is applied by slider technique. The mobilization is applied smooth and rhythmically for 1 minute. There was 30 second rest in between two repetitions. The maneuver is repeated for six time for 10 minutes.

6. Outcome Measurement

Outcome measurement tool included visual analogue scale (VAS) for pain intensity Goniometer for range of motion (ROM) and Manual muscle testing technique by using OXFORD muscle grade scale to assess the muscle strength of cervical spine. The reliability of VAS is 0.94 [12].

On the other hand, Neck Disability Index (NDI) measured disability. NDI is a commonly used outcome measure to demonstrate the actual level of disability among patients with neck pain and also it has higher level of validity and reliability.

Table 2. *Outcome measurement.*

Timeline > /Variable	Assessment (1st day)	Mid way (3rd week)	Final (6th week)	Measurement tools
Pain				
Resting pain	7	2	1	VAS scale
Pain with activity	9	6	1	
Cervical range of motion (ROM) in degree				
Flexion	20	40	50	Goniometer
Extension	25	35	60	
Right flexion	20	30	45	
Left flexion	30	35	45	
Right rotation	25	40	80	
Left rotation	55	65	80	
Manual muscle testing (MMT) of cervical spine				
Flexion	3	3+	4	Manual muscle testing (MMT)
Extension	3	3+	4	
Right flexion	3	3+	4	
Left flexion	3	3+	4	
Right rotation	3	3+	4	
Left rotation	3	3+	4	
Disability status in neck disability index (NDI)				
Disability status	55%	35%	20%	NDI

7. Discussion & Findings

Among the musculoskeletal disorders Cervical radiculopathy is one of most painful clinical scenarios. Six crucial ideas were found by the meta-ethnography (developing independence, developing compassion, learning about health and coping, missing out, emotional health, and struggles communicating with parents). Kids of parents with chronic pain generally had worse outcomes than other offspring across study designs, while the meta-ethnography did find some positive effects of having a parent with chronic pain [13]. According to this study, there is a substantial positive link between the amount of time spent using a mobile device and the frequency and intensity of neck pain. The healthcare system is also heavily taxed by the rising severity of neck pain. Patients suffering from radiculopathy typically have symptoms such as neck pain, arm pain, or both [14]. In current study a single case was discussed with the diagnosis. This includes an overview of the overall findings on the patient history and physical examination. Discussion also includes relevant clinical syndromes. The natural history of cervical radiculopathy is reviewed, and evidence-based management are discussed. Clinical reasoning refers to professional judgments made before, during and after clinical sessions in physical therapy and it support professional autonomy [15].

8. Conclusion

The current study suggests that application of the clinical reasoning process is effective for accuracy of diagnosis and application of evidence-based physiotherapy is effective for better outcomes for cervical rediculopathy patients. But as it is a single case study, further study is necessary to establish the statement.

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