

## Case Report

# Physiotherapy in Management of Neck Pain with Incidental Finding of C2-C3 Block Vertebra- A Case Report

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## Abstract

**Background:** Congenital C2-C3 synostosis or block vertebra is usually an incidental finding in patients with unrelated complaints. The condition may lead to biomechanical changes in the cervical spine. It may even result in a variety of symptoms such as neck pain and upper limb weakness.

**Case presentation:** A case of 30 year old female with neck pain was diagnosed to have c2-c3 synostosis. The intensity of pain was severe and was hampering the work-life of the patient. The patient was managed using a structured exercise plan, education about the condition and ergonomic advice.

**Conclusion:** A significant decrease in pain and disability was documented after the rehabilitation intervention of two weeks. Therefore exercises could be useful in managing neck pain resulting from block vertebra.

**Keywords:** Neck pain; Block vertebrae; Cervical vertebrae; Neurological rehabilitation; Congenital synostosis

## Introduction

Congenital C2-C3 synostosis or congenital cervical block vertebrae is a condition in which fusion of cervical vertebrae is seen at one or multiple levels such as the laminae, pedicles, body and spine of the vertebrae. It is considered to be a subject of interest by the anatomists as well as treating physicians and is well documented in the literature [1]. This condition is generally asymptomatic until adulthood. In fact, in most of the cases it is an incidental finding due an unrelated issue [2]. It is commonly found at C2-C3 and C5-C6 levels of cervical vertebrae. In some cases, it is also considered as the cause for disturbance in cervical spine biomechanics in terms of mobility and sheer stress [2,3]. Neurological signs and symptoms may occur as a result of cervical block vertebra namely neck stiffness, and radiating/non-radiating pain and muscle weakness of one or both upper limbs [4]. The main aim of this case study is to bring some light to the presence of block vertebra as a congenital anomaly and the role of physiotherapy in managing the clinical manifestations of the same.

## Case Presentation

### Client characteristics

The patient, a 30 year old female from Ludhiana, a computer

analyst by profession presented with a chief complaint of radiating neck pain to the right arm since one week. The patient has a history of a gym related injury that dates back to two years, and has ever since been going through episodes of pain once or twice every month. The 9:00 AM-5:00 PM sitting job of the patient involves the use of computers and laptops, which play a vital role in aggravating the nature of the pain [5]. Relieving factors include the use of non-steroidal anti-inflammatory drugs and muscle relaxants. The patient reports a history of cigarette smoking, one per day, since about five years, which is known to be a cause of early degenerative changes in the cervical spine (Figure 1) [6].

### Examination and findings

An X-ray of the cervical spine AP and lateral view were ordered.



Figure 1: X-ray imaging of the patient showing C2-C3 block vertebra.

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They were suggestive of C2-C3 fusion and osteoarthritic changes in the cervical spine in the form of osteocytes at C4, C5, and C6. This led to a diagnosis of a congenital C2 and C3 block vertebrae which was confirmed by an orthopaedic doctor. The patient was then referred for physical therapy. The pain, as assessed using Numeric Pain Rating Scale (NPRS) gradually progresses to a score of 8 each time, indicating severe pain. Upon examination, the cervical spine range of motion was seen to be painful and restricted, palpable gross tenderness was found over the upper and middle trapezius muscle and the cervical flexors. Tenderness was specifically found on the C2 and C3 spinal processes. Cervical musculature weakness was assumed due to chronic pain. Upper Limb Tension Test (ULTT) was positive for radial nerve. All sensations at the right upper limb and reflexes were normal. The case is described in terms of World Health Organisation's International Classification of Functioning, Disability and Health in Figure 2.

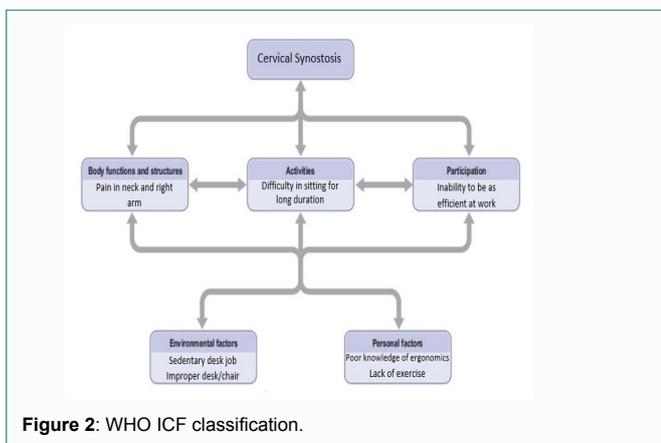


Figure 2: WHO ICF classification.

### Outcome measures

NPRS and Neck Disability Index were used as outcome measures for the purpose of this case study.

### Intervention

The patient was actively involved in the process of goal setting for planning a suitable physiotherapy protocol. The goals are as listed:

#### Short term goals:

- To relieve neck pain in 3-7 days.
- To improve cervical ROM

#### Long term goals:

- To strengthen the deep cervical flexor muscles
- To strengthen the other cervical musculature
- To provide ergonomic advice

The physiotherapy protocol is listed in Table 1 [5-10].

### Clinical significance

A significant improvement was seen with an improvement in NPRS from 8 (severe) to 3 (mild) in the span of 15 days. An improvement in the neck disability index score was seen from 19 (moderate disability) to 14 (mild disability). The patient was counselled to protect herself against further injury.

Table 1: Physiotherapy Intervention Plan.

Physiotherapy Protocol
• Reassurance, advice, education.
• Heating using Infrared lamp for 15 mins for pain relief
• Upper-thoracic vertebral AP glide increasing ROM and pain relief
• Cranio cervical flexion exercises for strengthening and pain relief
• PNF Stretching exercises for trapezius, pectoralis major and minor, and sternocleidomastoid for pain relief and relaxation.
• Posture correction and education.
• Positional Release Technique for trigger point release in the trapezius for pain relief
• Therapeutic massage techniques for pain relief
• PNF patterns for scapula and neck (both flexion and extension) - hold relax for increasing ROM and pain relief

### Discussion

The purpose of this case study was to provide a framework for approaching a patient with neck pain resulting from block vertebra. The study demonstrates a significant improvement in neck pain and disability resulting from neck pain as measured on NPRS and Neck Disability Index in two weeks. The amount of change in both the outcome measures implies the clinical significance of the rehabilitation protocol discussed. The results of our case study are supported by the existing literature and suggests that physiotherapy interventions can be successfully used for alleviating the symptoms of neck pain and disability associated with block vertebra [11,12]. The authors used interactive reasoning oriented Clinical Decision Making (CDM) model wherein the particular patient problem space was the frame of reference for CDM [13,14]. The patient was well-informed about the clinical condition and was actively made a part of the decision making and goal-setting process.

The improvement in the patient symptoms can be attributed to strengthening of the cervical musculature [15]. According to a Randomised Controlled Trial (RCT) by Lau et al. [7], mobilization of thoracic vertebra is associated with a long-term improvement in neck pain. Similar results were seen in this case study translating as a decrease in NPRS score. For releasing the trigger points, PRT was used. Pathan et al. [8], PRT is effective in trigger point release in trapezius and helps in reducing pain and improving cervical ROM. Similar findings were reported in our case study. According to Lee et al. [9], exercises that involve PNF have a positive effect in reducing the pain associated with trapezius muscle. The results of our case study seconded their findings.

According to an RCT by Chung and Jeong [10] isometric exercises and cervical flexion exercises are related to an improvement in cervical pain and neck disability index. These findings were supported by our case study. Ergonomic correction also plays a part in sustaining the results by reducing the undue loading and stress on the cervical spine. Thus the ergonomic advice helps in alleviating the symptoms and increasing the productivity at work. However, since this case report is one of the only few documented for physiotherapy treatment in block vertebra, more researches in the area are warranted to support the generalizability of the results.

### Conclusion

Patient reported pain and disability was reduced significantly since the first visit of the patient. The patient was able to get back to their usual level of activities and work after the rehabilitation program. Therefore, as demonstrated in this case report, patient education, structured strengthening program and ergonomic advice can be said

to have a positive role to play in improving the patient's symptoms related to block vertebra.

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