

# Management of Neglected Traumatic Bilateral Cervical Facet Dislocations Without Neurological Deficit

Kamran Farooque,<sup>1</sup> Kavin Khatri,<sup>1,\*</sup> Babita Gupta,<sup>2</sup> and Vijay Sharma<sup>1</sup>

<sup>1</sup>Department of Orthopedics, Jai Prakash Narayan Apex Trauma Centre, All India Institute of Medical Sciences, Delhi, India

<sup>2</sup>Department of Anesthesia and Critical Care Medicine, Jai Prakash Narayan Apex Trauma Centre, All India Institute of Medical Sciences, Delhi, India

\*Corresponding author: Kavin Khatri, Department of Orthopaedics, Jai Prakash Narayan Apex Trauma Centre, All India Institute of Medical Sciences, Safdarjung Enclave New Delhi, Delhi, India. Tel./Fax: +91-8743878077, E-mail: kavinkhatri84@gmail.com

Received 2014 March 02; Accepted 2014 March 23.

## Abstract

**Introduction:** Sub axial cervical spine dislocations are common and managing these cases by closed reduction is successful in the majority of cases. However, treatment of old and neglected cases is difficult and the results may vary in terms of neurological and functional outcomes.

**Case Presentation:** We present two cases of traumatic bilateral cervical facet dislocation with no neurological deficit (ND) who referred four months after the injury. They were managed via single stage anterior discectomy, posterior facet reduction, instrumentation, and then anterior reconstruction with bone graft and cervical plate. The patients had no ND in the postoperative period and returned to work.

**Discussion:** Patients presenting with neck pain after a history of trauma should be evaluated thoroughly with radiographs and computed tomography. The management of old neglected facet dislocations is difficult, lengthy, and fraught with potential neurological complications; operative intervention can substantially improve the quality of life in these patients.

**Keywords:** Dislocations, Facet Joint, Cervical, Neck

## 1. Introduction

Cervical facet dislocations constitute a significant number of cases among cervical spine injuries. The vast majority of bilateral cervical facet dislocations are associated with significant neurological deficit (ND). Only a few cases with bilateral cervical facet dislocation without neurological deficit have been reported in the literature. Emergent intervention in these cases can prevent major neurological events or late onset of ND. Delayed presentation in these cases can pose a major surgical challenge and moreover, there is a lack of consensus for its management (1). We reported two cases of traumatic bilateral cervical facet dislocation 16 and 20 weeks after injury. The patients had no ND. They were managed via single stage anterior and posterior surgery. Initially anterior discectomy was followed by posterior facet reduction and instrumentation and finally, anterior reconstruction with tricortical graft and plating.

## 2. Case Presentation

### 2.1. First Case

A 24-year-old male presented with neck pain following road traffic accident four months ago. He had had a head-on collision with an oil tanker while he was in the back-seat of the car. The probable mechanism of injury was postulated to have been flexion distraction injury at the sub

axial spine. He experienced severe no radiating pain in the neck. There was no history of loss of consciousness, seizure, vomiting, or bleeding through the ear, nose, or throat. He also complained of tingling sensations in bilateral upper limbs; however, there were neither muscular weaknesses nor gait disturbance. There were no bladder or bowel complaints. No steroidal anti-inflammatory drugs (NSAIDs) were prescribed by a general physician for neck pain and no radiographic examination of the neck was performed. There was a decrease in intensity of neck pain and tingling sensations since the time of injury. The patient referred to our out-patient department four months after the injury complaining of neck pain, which was mild to moderate in intensity. The physical examination revealed restriction of neck movements. Neurological examination revealed no significant finding for tone and power in all the four extremities. There was no sensory disturbance and deep tendon reflexes examination findings were unremarkable. The radiographs of the neck suggested subluxation of the fifth cervical vertebrae (C<sub>5</sub>) over the sixth cervical vertebrae (C<sub>6</sub>) with greater than 50% translocation in the anteroposterior plane and interspinous widening (Figure 1A). Computed tomography (CT) revealed bilateral facet dislocation of C<sub>5</sub> over C<sub>6</sub> (Figure 1B). Magnetic resonance imaging (MRI) confirmed the CT findings of bilateral facet dislocation and compression of the cervical cord with

disc prolapse at the C<sub>5</sub>-C<sub>6</sub> level (Figure 1 C). Closed reduction of the dislocation was not attempted as four months had passed since the time of injury and there were signs of partial facet fusion on CT.

## 2.2. Description of the Second Case

A 35-year-old male fell from a height of approximately ten feet and experienced pain in the neck along with numbness in bilateral upper limbs. There was no motor weakness of the limbs and no bladder or bowel problems. A local physician had prescribed NSAIDs for his neck pain. No radiographic examination was performed. He continued to experience neck pain with intermittent relief after taking NSAIDs. Five months after the injury, he referred to our institute complaining of neck pain. The pain was nonradiating but there was numbness in both upper limbs since the injury. On examination, there was restriction of neck movements. Clinical examination was otherwise unremarkable. The X-ray, CT, and MRI of the neck revealed bilateral facet dislocation at C<sub>5</sub>-C<sub>6</sub> (Figure 2). Closed reduction was not attempted in this case, due to the long time lapse since injury and partial fusion at the C<sub>5</sub>-C<sub>6</sub> vertebrae.

## 2.3. Operative Procedure

The patients were operated by the senior author (KF) with the patient in supine position on a radiolucent table with Crutchfield tongs in situ. The cervical spine was exposed by standard anterior approach. The fibrocartilaginous tissue and bone were removed from the anterior surface of the C<sub>5</sub> and C<sub>6</sub> vertebral bodies. A complete microscopic anterior discectomy was performed at C<sub>5</sub>-C<sub>6</sub> level. Temporary wound closure of skin and subcutaneous tissue was done.

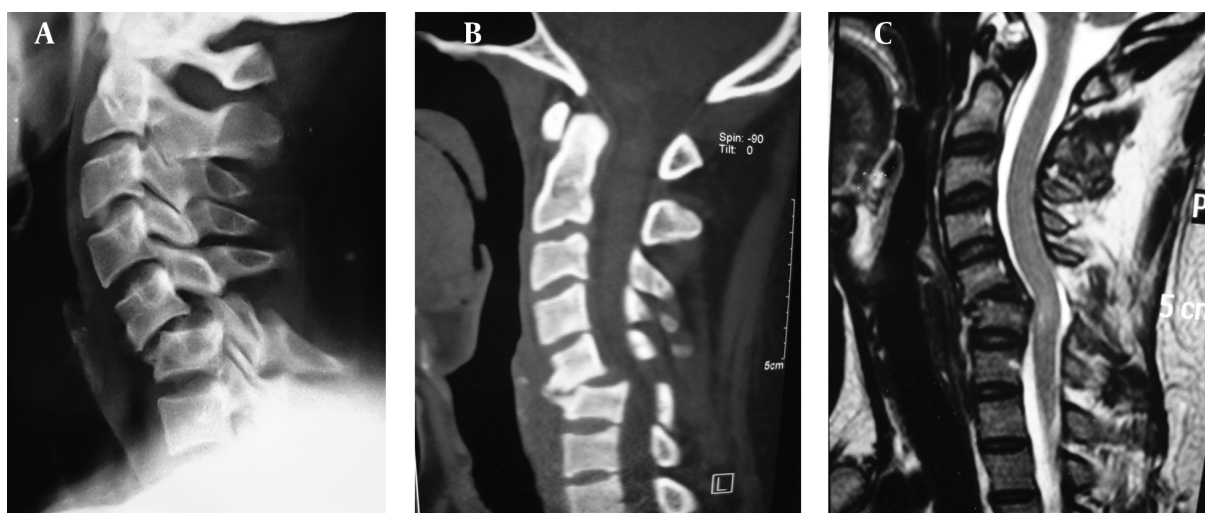
The patient was then turned to the prone position and a standard posterior midline exposure was performed from C3 to C7. Bilateral inferior facets of the superior vertebrae were perched over the superior articulating facets of the inferior vertebrae. There was partial bony fusion between locked facets. The superior articulating facets of the inferior vertebrae were partially resected to achieve reduction. Lateral mass screws at C5 and C6 vertebra were inserted under fluoroscopic guidance. The reduction was achieved with the help of progressive extension. The reduction was confirmed under fluoroscopy. The rods were secured on the screws and the wound was closed in layers. Then the patient was carefully turned to supine position for instrumented anterior cervical interbody fusion. The anterior wound was reopened. The interbody area was prepared and measured with a calibrated device and a tricortical iliac crest bone graft of the same dimensions was harvested. The graft was inserted in the interbody area and se-

cured with a locking plate (AO, Synthes, Solothurn, Switzerland). The wound was closed with a suction drain. The duration of surgery was about 240 minutes with blood loss of about 350 mL.

Postoperatively, the patients were mobilized in a Philadelphia collar for eight weeks. There was no postoperative neurological deficit and wound healing was uneventful. Follow-up radiographs included anteroposterior, lateral, flexion, and extension views (Figure 3 A) along with CT scanning at six months (Figure 3 B). The neck movements were also painless at six months follow-up. The clinical and radiological signs were suggestive of good interbody fusion. Both patients returned to work.

## 3. Discussion

Cervical spine injuries are associated with high mortality and morbidity rates (2). The flexion distraction force to the cervical spine can lead to bilateral facet dislocation. This is an unstable injury and can present with late onset of neurological deterioration. Cervical spine injury is frequently missed at the initial evaluation with an incidence reported as high as 30% (3). Various reasons have been mentioned for missed injuries including misinterpretation or inadequate radiographs and lack of suspicion at the time of initial presentation. Mahale et al. (3) reported 13 cases of missed bilateral cervical facet dislocation who had developed neurological manifestations at later stages. Sengupta et al. (4) have stressed on following an appropriate protocol before clearing a patient of cervical spine injury. They recommended the use of MRI in addition to routine X-ray radiographs and CT to assess the cervical spine injury. Gerrelts et al. (5) suggested that dynamic views of the cervical spine should be avoided in cases of acute injury as it can precipitate a neurological deficit. In both our cases, the injury was not suspected at the initial presentation and hence, neglected by the primary physicians. The diagnosis of bilateral Facet dislocation was made only after appropriate investigations were done. Closed reduction of cervical facet dislocation in acute injury is successful in many cases; however, the success rate decreases rapidly as the interval between the reduction attempt and injury increases and becomes as low as 16% in old neglected cases (6). Thus, both of our patients were managed surgically in view of the low success rate of closed reduction reported in the literature. Bilateral facet dislocations are inherently unstable injuries and generally require operative intervention for stabilization. In acute bilateral facet dislocation, Kim et al. (7) reported good results with anterior cervical discectomy and fusion in cases that were reduced with closed reduction. Single stage posteroanterior approach was used for cases in whom closed reduction was not successful. In



**Figure 1.** Imaging of First Case. A, Radiograph of the first case showing subluxation of the fifth cervical vertebrae (C5) over the sixth cervical vertebrae (C6). B, Computed tomography scan, new bone formation between the adjacent vertebrae in addition to subluxation. C, Magnetic resonance imaging indicating compression of the cervical cord with disc prolapses at the C5-C6 level.

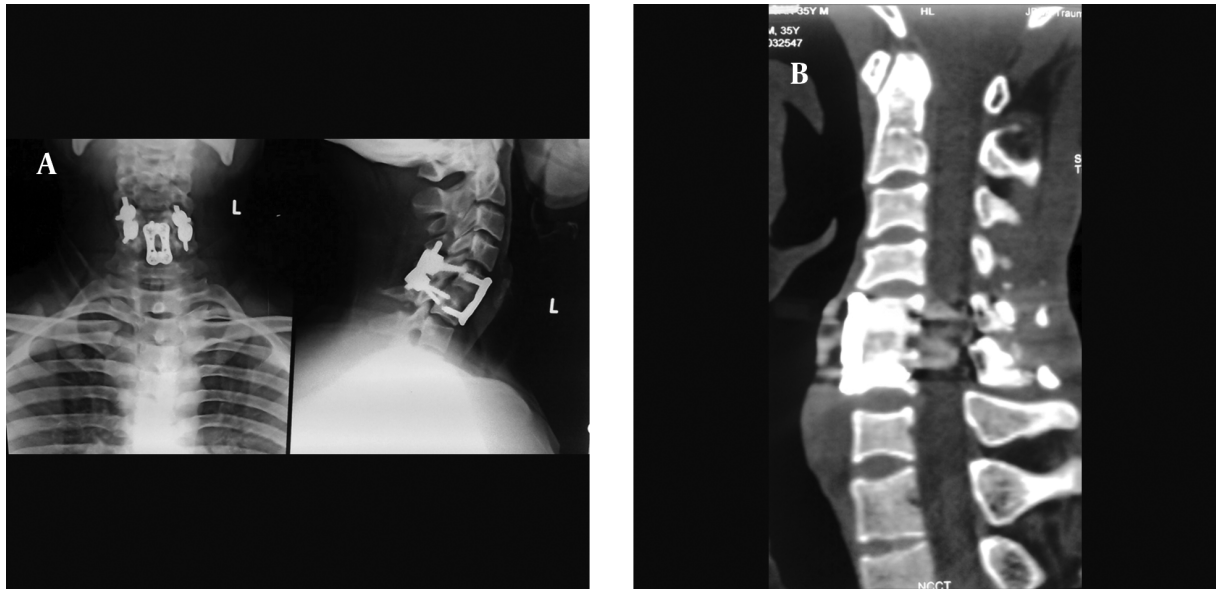


**Figure 2.** Imaging of Second Case. A, Lateral radiograph of the second case showing subluxation of the fifth cervical vertebrae (C5) over the sixth cervical vertebrae (C6) by more than 50%. B, Computed tomography of cervical spine indicating a bony bridge between C5 and C6 vertebral bodies. C, Magnetic resonance imaging showing cervical disc prolapse at C5-C6 intervertebral level.

their cases, open reduction and internal fixation was done with lateral mass screws or interspinous wiring, followed

by anterior cervical discectomy and fusion.

However, there is controversy in literature regarding



**Figure 3.** Follow-up X-Ray Radiographs and Computed Tomography Images at Six Months. A, X-ray view and B, computed tomography of the neck showed good interbody fusion.

the management of old or neglected cases of facet dislocation. Bartels et al. (8) proposed posterior facetectomy followed by anterior decompression and fusion with posterior instrumentation in cases presenting after eight weeks of bilateral facet dislocation. Basu et al. (9) approached the cases depending upon the status of disc. In cases of disc herniation, the anterior approach was added while most of the other cases were managed with posterior facetectomy and fusion. Jain et al. (10) had approached the cases of neglected subaxial facet dislocation through posteroanterior approach and achieved fusion in all the four cases without neurological deficit. Hassan et al. (6) also managed most of their cases by posteroanterior approach with good results in all the patients. Payer et al. (11) used an anterior-posterior-anterior approach in a case of bilateral cervical facet dislocation without neurological deficit presenting ten weeks after trauma. In our cases, there was partial fusion anteriorly between vertebral bodies and posteriorly over the facet joints. We followed anterior-posterior and then anterior approach to achieve reduction. Initially, anterior surgery was performed to remove the fusion mass between vertebral bodies and to achieve complete discectomy before attempting the reduction posteriorly. Attempting a reduction posteriorly without prior discectomy not only makes the reduction more difficult, but also increases an inherent risk of cord compression by a prolapsed disc during the reduction maneuver. Both anterior-posterior-anterior and posterior-

anterior-posterior approaches have been used to achieve reduction. In both approaches the discectomy is performed before achieving reduction; however, there is an advantage of less number of positioning times in anterior-posterior-anterior (supine-prone-supine); as the patient is made prone once. In the posterior-anterior-posterior approach (supine-prone-supine-prone-supine) the patient is turned prone twice (avoiding anesthetic problems and complications associated with prone positioning). We conclude that patients presenting with neck pain after a significant history of trauma should be thoroughly evaluated with radiographs and CT. Cervical spine dislocations generally presents with neurological deficit; however, few cases may have no neurological deficit at all. These are the cases that can be missed at the first visit and hence, the opportunity of achieving closed reduction may be lost. Though the management of old neglected facet dislocations is difficult and is associated with potential neurological complications, operative intervention can substantially improve the quality of life in these patients.

#### Footnote

**Authors' Contributions:** Kamran Farooque developed the original idea and the protocol, abstracted and analyzed data, wrote the manuscript, and was the guarantor. Kavin Khatri, Babita Gupta, and Vijay Sharma contributed to the development of the protocol, abstracting the data, and preparation of the manuscript.

## References

1. Bono C, Carreras E. In: Fractures in adults. Bucholz R, Heckman J, Tornetta P, editors. Philadelphia: Lippincott-Raven; 2014. pp. 1312–76. Cervical spine fractures and dislocations.
2. Goldberg W, Mueller C, Panacek E, Tigges S, Hoffman JR, Mower WR, et al. Distribution and patterns of blunt traumatic cervical spine injury. *Ann Emerg Med*. 2001;**38**(1):17–21. doi: [10.1067/mem.2001.116150](https://doi.org/10.1067/mem.2001.116150). [PubMed: [11423806](https://pubmed.ncbi.nlm.nih.gov/11423806/)].
3. Mahale YJ, Silver JR. Progressive paralysis after bilateral facet dislocation of the cervical spine. *J Bone Joint Surg Br*. 1992;**74**(2):219–23. [PubMed: [1544956](https://pubmed.ncbi.nlm.nih.gov/1544956/)].
4. Sengupta DK. Neglected spinal injuries. *Clin Orthop Relat Res*. 2005(431):93–103. [PubMed: [15685061](https://pubmed.ncbi.nlm.nih.gov/15685061/)].
5. Gerrelts BD, Petersen EU, Mabry J, Petersen SR. Delayed Diagnosis of Cervical Spine Injuries. *J Trauma Acute Care Surg*. 1991;**31**(12):1622–6.
6. Hassan MG. Treatment of old dislocations of the lower cervical spine. *Int Orthop*. 2002;**26**(5):263–7. doi: [10.1007/s00264-002-0350-8](https://doi.org/10.1007/s00264-002-0350-8). [PubMed: [12378349](https://pubmed.ncbi.nlm.nih.gov/12378349/)].
7. Kim KH, Cho DC, Sung JK. The management of bilateral interfacetal dislocation with anterior fixation in cervical spine : comparison with combined antero-posterior fixation. *J Korean Neurosurg Soc*. 2007;**42**(4):305–10. doi: [10.3340/jkns.2007.42.4.305](https://doi.org/10.3340/jkns.2007.42.4.305). [PubMed: [19096561](https://pubmed.ncbi.nlm.nih.gov/19096561/)].
8. Bartels RH, Donk R. Delayed management of traumatic bilateral cervical facet dislocation: surgical strategy. Report of three cases. *J Neurosurg*. 2002;**97**(3 Suppl):362–5. [PubMed: [12408394](https://pubmed.ncbi.nlm.nih.gov/12408394/)].
9. Basu S, Malik FH, Ghosh JD, Tikoo A. Delayed presentation of cervical facet dislocations. *J Orthop Surg (Hong Kong)*. 2011;**19**(3):331–5. [PubMed: [22184165](https://pubmed.ncbi.nlm.nih.gov/22184165/)].
10. Jain AK, Dhammi IK, Singh AP, Mishra P. Neglected traumatic dislocation of the subaxial cervical spine. *J Bone Joint Surg Br*. 2010;**92**(2):246–9. doi: [10.1302/0301-620X.92B2.22963](https://doi.org/10.1302/0301-620X.92B2.22963). [PubMed: [20130317](https://pubmed.ncbi.nlm.nih.gov/20130317/)].
11. Payer M, Tessitore E. Delayed surgical management of a traumatic bilateral cervical facet dislocation by an anterior-posterior-anterior approach. *J Clin Neurosci*. 2007;**14**(8):782–6. doi: [10.1016/j.jocn.2006.04.021](https://doi.org/10.1016/j.jocn.2006.04.021). [PubMed: [17531492](https://pubmed.ncbi.nlm.nih.gov/17531492/)].