



## To Evaluate the Long Term Functional and Neurological Results of Anterior Only Decompression and Fixation in Cases of Cervical Spine Injury with Facetal Dislocation

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Type of Publication: Original Research Paper

Conflicts of Interest: Nil

### ABSTRACT

**Introduction:** Cervical spine injury in the form of facetal dislocation is a common injury pattern. Literature describes various treatment options ranging from conservative methods to anterior plus posterior surgical decompression and fixation. Our study aims to evaluate the long term functional and neurological results of anterior only decompression and fixation in cases of cervical spine injury with facetal dislocation.

**Methods:** It a prospective study done at Shyam Shah Medical College and associated S.G.M.H. Rewa from July 2018 to Dec 2020. It included 22 conscious patients of cervical spine injury with facetal dislocation with no head injury. Crutchfield skull traction was applied in all these patients as a trial for awake close reduction. Those reduced, were fixed by autologous tri-cortical ilac crest bone grafting and anterior plating. Those who could not, were taken for surgery for open reduction and then fixation. All these patients were followed for 6 months to evaluate the results.

**Observations and results:** Study included 16 male and 6 females. 12 were having unilateral and 10 were having bilateral facet dislocation. 8 out of the 22 patients were reduced by crutchfield skull traction. Other 14 patients required open reduction and fixation. No patient required posterior facetectomy and fusion. At the end of 12 months all these patients had stable cervical spine with fair range of pain free neck movement and showed fair level of neurological recovery according to ASIA grading.

**Conclusion:** Cervical facet joint dislocation can be very well treated with anterior only surgery with fair results.

**Keywords:** Cervical spine, Facet, Unilateral, Bilateral, Reduction

### INTRODUCTION

Cervical spine injuries are common these days because of high velocity trauma is on the rise. Surgical treatment of subaxial cervical spine injuries is indicated for decompression of spinal cord and nerve roots and reestablishing cervical alignment.<sup>1</sup> Unilateral and bilateral facetal dislocation is also commonly associated with these injuries, which need to be reduced before fixation to get a better surgical outcome. Although the literature supports that both anterior and posterior stabilization have similar

clinical outcomes with good surgical results, there are advantages and disadvantages of one over the other in the management of facet dislocations.<sup>2,3</sup>

Anterior cervical spine surgery is preferred by some spine surgeons because it is relatively easy, need less surgical expertise, decrease the implant cost, have less blood loss and need no special surgical table/equipments.<sup>3</sup> But anterior approach warrant a indirect facetal reduction, which is considered

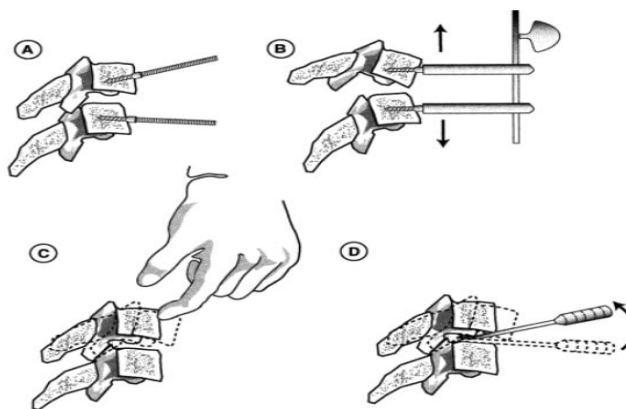
dangerous by some surgeons. We have conducted this study to see the long term functional and neurological results of patients with cervical spine injury with facet dislocation operated with anterior only approach.

### Material and methods:

It was prospective study done at Department of Orthopaedics SSMC & SGMH Rewa M.P. from July 2018 to Dec 2020. It included 22 patients of cervical spine injury with facet dislocation with no head injury. Patients with chronic injury with pseudoarthrosis/ gross mal-alignment, very poor bone quality, metabolic bone diseases and ankylosing

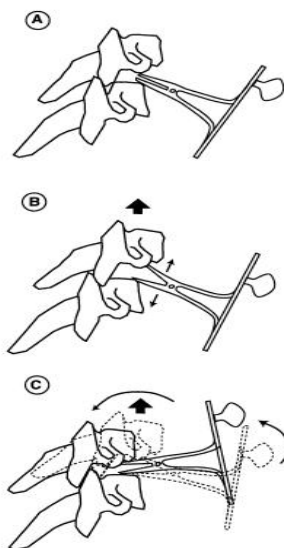
spondylitis were excluded from the study. Crutchfield skull traction was applied in all these patients for awake close reduction. Those reduced, were fixed by autologous tri-cortical ilac crest bone grafting and anterior plating. Those who could not, were taken for surgery for open reduction and fixation. All these patients were operated with anterior only approach. Facetal dislocations were reduced using Caspars cervical distractor pins or cervical disc interspace distractor. After reduction they were fixed with autologous tri-cortical ilac crest bone graft at the inter-vertebral disc space and anterior plating. These patients were followed for 12 months to evaluate the results.

**Fig 1: Reduction technique using Caspars cervical distractor pin**



Illustrations. Placing distractor pins at approximately a 10 to 20° angle with respect to each other in the sagittal plane (A) permits the creation of a kyphosis (B), which in turn disengages the facets. This permits reduction of the dislocation, with the assistance of dorsal force application to the rostral vertebra. This dorsal force can be applied using manual pressure (C) or a curette (D) or similar device. Removal of the distraction then allows the facet joint to reengage, with normal alignment.

**Fig 2: Reduction technique using disc interspace spreader**



Illustrations. A disc interspace spreader can be used to reduce deformities by placing the spreader in the disc interspace at an angle (A). Distraction (B) to disengage the facet joints and rotation (C) to reduce the deformity (*dotted vertebra*) are then performed.

### Observations and results:

Study included 22 patients, 16 men and 6 females. Eighteen patients were involved in road traffic accident, two patient had a history of fall of heavy object over his head and two patient has fall due to

slip. Twelve patient were having unilateral and 10 were having bilateral facet dislocation. 8 out of the 22 patients were reduced by crutchfield skull traction. Other 14 patients required open reduction and fixation. No patient required posterior facetectomy and fusion. At the end of 6 months all these patients had stable cervical spine with fair range of pain free neck movement. Their neurological status at the time of presentation and at six month has been described in the table below:

**Table 1: Showing the demographics, mode of trauma, injury pattern and neurological status at the time of injury and at six month follow up**

Serial no	Male/ Female	Mode of Trauma	Unilateral /Bilateral facet dislocation	ASIA grade at presentation	Result of close reduction	Asia grade at 12 months
1	Female	RTA	Unilateral	E	Not reduced	E
2	Male	RTA	Bilateral	A	Reduced	B
3	Male	RTA	Unilateral	E	Not reduced	E
4	Male	RTA	Unilateral	D	Reduced	E
5	Male	RTA	Bilateral	A	Not reduced	A
6	Male	Fall of heavy object	Bilateral	B	Not reduced	D
7	Male	RTA	Unilateral	C	Not reduced	E
8	Female	Slip	Bilateral	C	Reduced	E
9	Male	RTA	Unilateral	B	Not reduced	C
10	Male	RTA	Unilateral	D	Not reduced	E
11	Female	RTA	Bilateral	A	Reduced	A
12	Female	RTA	Unilateral	E	Not reduced	E
13	Male	RTA	Bilateral	A	Redeced	B
14	Male	RTA	Unilateral	E	Not reduced	E
15	Male	RTA	Unilateral	D	Reduced	E
16	Male	RTA	Bilateral	A	Not reduced	A
17	Female	Fall of heavy object	Bilateral	B	Not reduced	D

18	Male	RTA	Unilateral	C	Not reduced	E
19	Male	Slip	Bilateral	C	Reduced	E
20	Male	RTA	Unilateral	B	Not reduced	C
21	Female	RTA	Unilateral	D	Not reduced	E
22	Male	RTA	Bilateral	A	Reduced	A

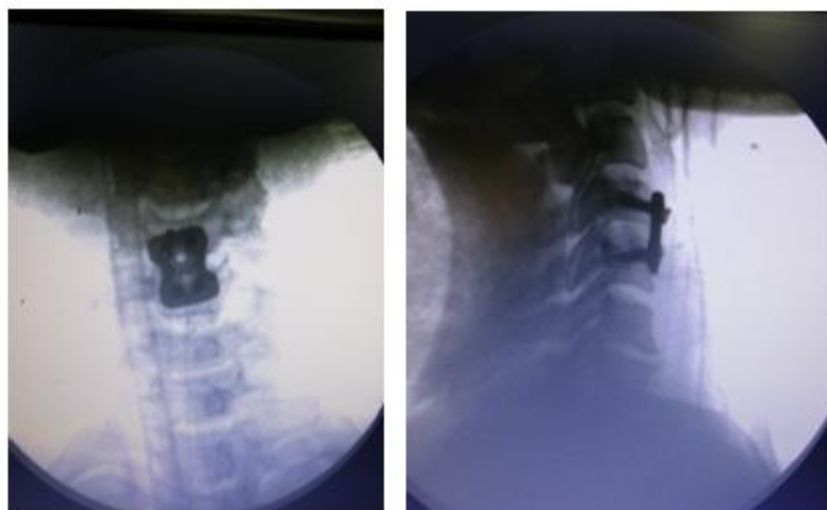
**Fig 3: Serial X rays of patient no 8 with bilateral facetal dislocation**



Post traumatic bilateral C4-5 facetal dislocation



Close reduction by skull traction



Immediate post AP and lateral X rays



AP and lateral X rays at 6 months



AP, lateral in extension and lateral in flexion X rays at 12 months no instability and good fusion

### Discussion:

Cervical spine fracture can be fixed with anterior, posterior or a combined anterior plus posterior approach. Although good surgical outcomes can be obtained with any technique, there are specific conditions in which one may prefer one approach over other. Best approach is chosen based on the site of spinal cord compression, presence of additional bone fracture in the vertebral body or in the posterior bone elements and the surgeon preference/expertise<sup>1,4,5,6,7</sup>

Anterior approaches can restore cervical lordosis, cause less postoperative pain than posterior cervical

surgeries (Level of Evidence: III).<sup>8</sup> Anterior approaches have the advantages of supine position, less surgical trauma, and direct anterior decompression of neural elements, like a disk herniation or an anterior located bone fragment (Level of Evidence: III)<sup>8</sup>. Potential disadvantages may include postoperative dysphagia (most common), esophageal injury (rare) and difficulty in achieving facet reduction in some cases, especially chronic dislocations (Level of Evidence: III)<sup>1,9,10,11</sup>

Posterior approaches, on the other hand, may provide direct reduction of dislocations and stronger



constructions, which can be interesting for patients with poor bone quality, such as those with ankylosing spondylitis or osteoporosis (Level of Evidence: III)<sup>9,12,13</sup> Posterior facet reduction is a contraindication in patients with an anterior spinal cord compression with an intact or residual neurological function, given the risk of deterioration during the reduction maneuver.<sup>14</sup> Unstable patients also have problems with operation in the prone position. It also require specialized operating table and head holder, costlier surgical implant, associated with more blood loss, operating time and need of blood transfusion.<sup>3</sup>

Considering the advantages of anterior cervical spine surgery, most surgeons prefer doing anterior cervical spine surgery. But in cases of facet dislocation which require manipulation and reduction anterior approach is considered dangerous.<sup>15</sup> We could find only one study done on cervical spine with facet dislocation which compares the anterior vs posterior approach. Kwon *et al.*<sup>3</sup> performed a prospective randomized controlled study using 42 patients with unilateral facet dislocation, or fracture-dislocation between C3 and T1 levels. Patients underwent an ACDF or posterior fixation (Level of Evidence: II). They concluded that both techniques were effective and had similar outcomes, even though patients who underwent anterior surgery had a higher rate of fusion and less postoperative pain and wound problems than patients treated with a posterior approach. Our prospective case series also suggest that anterior only approach for the treatment of cervical spine injury with facet dislocation is a safe and give good results.

### Conclusion:

Cervical spine injury with facet joint dislocation can be very well treated with anterior only surgery with fair results.

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