

## **Traumatic Cervical Chance Fracture**

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### **Abstract**

#### **Presentation**

A 64-year old male presented three days after a road-traffic-accident with associated loss of consciousness. Neurological assessment indicated a complete absence of sensory and motor innervation in the upper and lower extremities, with absent anal sensation.

#### **Diagnosis**

Imaging showed fractures of the C5-C7 spinous processes, with a C6 chance fracture. Additionally, there was widening of the disc space and facet joints, ligamentous disruption, and mild canal stenosis.

#### **Treatment**

Surgically managed (ACDF) and recovered well in the postoperative period without complication.

#### **Conclusion**

In consideration with other reports in the literature, it would appear cervical chance fractures can be managed effectively with either ACDF or PCDF when surgical intervention is required.

**Keywords:** Chance fractures, traumatic cervical spine injury, spine surgery

## Introduction

Chance fractures are a rare phenomenon defined as a horizontal fracture through all three spinal columns secondary to a flexion-distraction injury<sup>1</sup>. They occur almost exclusively in the thoracolumbar spine and/or in patients with ankylosing spondylitis<sup>2</sup>. Traumatic chance (flexion-distraction) fractures of the cervical spine are even rarer due to the inherent mobility of the cervical spine<sup>3</sup>, with literary evidence limited to a handful of reports<sup>2,4,5</sup>. As a result, the definitive treatment strategy remains unknown. The aim of this study is to identify patients at our institution that presented with a traumatic cervical chance fracture (and no history of ankylosing spondylitis), disclose the presentation and management, and review existing literature.

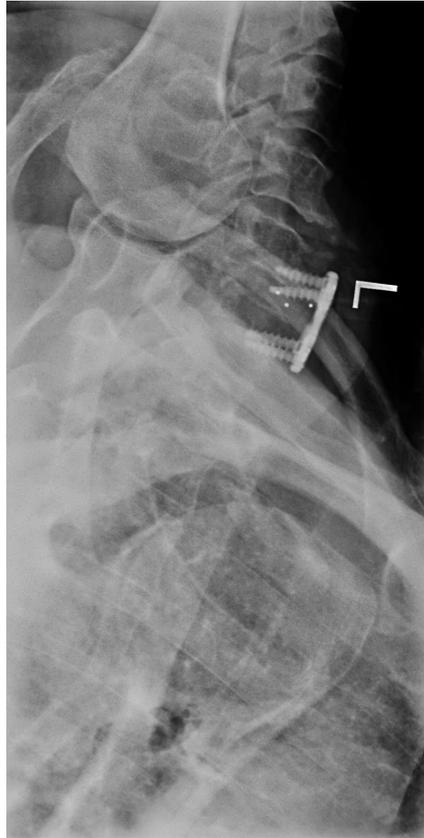
## Case Report

Case X is a 64-year-old male referred three days after being involved in a road-traffic-accident (RTA) with associated loss of consciousness. Imaging showed fractures of the C5-C7 spinous processes, with a C6 chance fracture (Figure 1). Additionally, there was widening of the disc space and facet joints, ligamentous disruption, and mild canal stenosis (Figure 1). There were additional fractures of the L1-L4 transverse processes. CT showed a sub-arachnoid haemorrhage, and neurosurgical consult warranted no emergent surgical intervention. Neurological assessment indicated a complete absence of sensory and motor innervation in the upper and lower extremities, with absent anal sensation.



**Figure 1:** Sagittal T2-weighted MRI depicting a widening of the intervertebral disc space, with evident disruption of anterior and posterior longitudinal ligaments and associated oedema.

The patient underwent a C6-C7 anterior cervical discectomy and fusion (ACDF) (Figure 2) with no intraoperative complications. Postoperatively, the patient had a reduced level of consciousness requiring nasogastric feeding. The patient was discharged home 7 days later in a Miami J collar for follow-up in three weeks. On follow-up, neurological assessment was unable to be fully elicited due to confusion, although he appeared to have sensation in all extremities, with notable residual power deficit in the right arm (2/5). Imaging was satisfactory with normal alignment. The patient no longer required nasogastric feed and had returned to fluids and soft diet.



**Figure 2:** Postoperative oblique view radiograph highlighting C6-C7 ACDF.

## Discussion

To date, there are only three studies regarding the management of traumatic cervical chance (flexion-distraction) fractures. Rowell et al.<sup>4</sup> report the case of a 40-year old female involved in a motor vehicle collision. Radiographs depicted a chance fracture through C6, with disc protrusion and extrinsic compression of the anterior cervical cord. The patient underwent posterior cervical discectomy and fusion (PCDF), with resolution of paraesthesia and pain, and no associated postoperative complications. Eghbal et al.<sup>2</sup> describe the case of 33-year old male pedestrian struck by a car, complaining of severe neck pain and paraesthesia in the 4<sup>th</sup> and 5<sup>th</sup> fingers of both upper extremities. MRI revealed a C7 chance fracture, with associated ligamentous disruption. Similarly, the patient underwent PCDF, with resolution of all symptoms at 6-month follow-up. Korres et al.<sup>5</sup> report two cases of chance fractures of the axis, both managed conservatively.

Both patients were treated with skull traction for the initial 6 weeks, followed by another 6 weeks of personalized cervical immobilization. Both patients recovered full cervical motion and had no complaints of residual pain. These two patients represented just 1% (2/184) of all axis fractures that presented to Korres' institution over a 32-year period, highlighting their rarity.

Chance fractures in the thoracolumbar region are managed based on the presence of neurological deficit<sup>6</sup>. It is currently unknown whether similar strategies are applicable to traumatic cervical chance fractures as the spinal regions are biomechanically and anatomically distinct<sup>6,7</sup>. In consideration with existing literature, a conservative approach may be implemented for traumatic cervical chance fractures with no associated neurological deficit or retropulsion of vertebral elements. Although ACDF was employed as the surgical approach in our case, it would appear an anterior or posterior approach can achieve desirable postoperative outcomes.

#### **Declaration of Conflicts of Interest:**

The authors have no conflicts of interest to declare.

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