

# Flexion compression type of traumatic C7–T1 cervical spondyloptosis without neurological deficit

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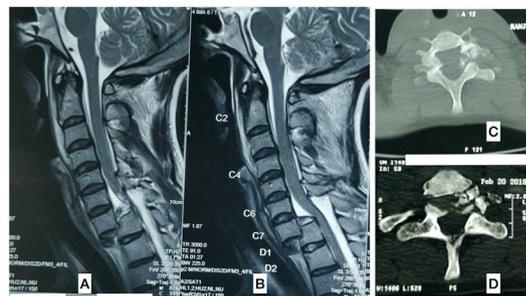
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## DESCRIPTION

Spondyloptosis of the spine is complete dislocation of one vertebral body on to another. Cervical spondyloptosis are comparatively rare when compared to the lumbar spondyloptosis and are usually associated with neurological deficit.<sup>1,2</sup> Close to 80% of cervical spondyloptosis are associated with neurological deficit.<sup>3</sup> Among them, spondyloptosis at C7–T1 is even rarer and only three cases are reported in the available literature.<sup>4–6</sup> We present one such case of cervicothoracic junctional spondyloptosis without neurological deficit managed by anterior and posterior fusion of the spine with instrumentation.

A 40-year-old man had a head-on collision with another vehicle while driving his truck (sudden decelerating injury). He presented with severe pain in the neck. On the initial assessment, the patient was haemodynamically stable and had no neurological deficit (ASIA-E). His radiology revealed a compression and flexion type of C7–T1 cervical spondyloptosis, with bilateral pedicle fracture and complete dissociation of the C7 vertebral body from posterior elements (figures 1A,B and 2A). Contrary to usual, there was unilateral facet dislocation and fracture of the superior articular facet of C7 at a level (C6/C7) higher than the spondyloptotic level (C7–T1) (figure 1A,B). The neck immobilisation was continued with hard cervical collar; any attempt for the closed reduction was avoided given the unstable pattern of the injury and the patient was shifted to the operating room on an emergency basis. We proceeded with anterior discectomy with a trial for the reduction of the anterior column. As acceptable realignment could not be achieved, the patient was repositioned to prone on the operating table. The posterior column reduction was achieved



**Figure 1** (A and B) MRI showing spondyloptosis of C7 over T1 with C6–C7 facet dislocation, without signs of cord compression. (C and D) CT axial images showing uncompromised canal diameter and anterior translation of C7 over T1 with left superior articular facet fracture.



**Figure 2** (A) Axial MRI at the level of T1 showing spondyloptosis. (B) Axial MRI at the spondyloptotic level C7–T1 showing uncompromised canal. (C and D) Postoperative radiograph of lateral and anteroposterior view of the cervical spine with instrumentation. (E) 1-year follow-up of the patient, with no deficit.

by performing facetectomy of the intact right superior articular facet of C7 as the left superior articular facet was fractured (figure 1C,D) and stabilised with lateral mass screws in C5–C6 and pedicle screws in T1 (figure 2C,D). It was then followed with anterior column reduction. The reduction manoeuvre consisted of hyperextending the neck and levering C7 over T1 using two Penfield dissectors. The reduction was fixed with an anterior cervical locking plate for C7–T1 and tricortical bone graft from the right iliac crest (figure 2C,D). Postoperative events were uneventful, and the patient returned to the previous level of activity without neurological deterioration at 1-year follow-up (figure 2E).

Traumatic cervical spondyloptosis without neurological deficit is rare, with only a few cases of C7–T1 involvement.<sup>4–6</sup> These types of injuries are circumferential (vertebral body, anterior and posterior ligaments, lamina and pedicles are involved), making it inherently unstable and more prone to neurological deficits.<sup>3</sup> The probable explanation for intact neurology in such injuries is due to the complete dissociation of the anterior body from the posterior elements along with posterior lamina fracture, which lead to natural decompression of the cord.<sup>5</sup> In this case, the facet dislocation was at a level higher (C6–C7) than the spondyloptotic level (C7–T1), without signs of cord compression or oedema (figures 1B and 2B), and the anterior column was completely dissociated with the posterior elements along with bilateral C7 pedicle fractures, which explains why there was no deficit (figure 1B).

The goal in the management of such cases is to restore the spinal alignment, decompress the cord,



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## Images in...

achieve stable fixation and provide early rehabilitation. Multiple surgical procedures and sequences have been described to achieve an optimal functional result.<sup>5-8</sup> However, it is also noted that irrespective of the method of treatment used, the outcomes did not differ much.<sup>8</sup> There has been a constant debate on the mode and sequence of fixation in such cases. While the majority focus on 360° fusion, few prefer anterior or posterior fixation alone.<sup>2-8</sup>

Modi *et al*<sup>8</sup> have recommended using the neurological status of the patient to guide the choice of surgical treatment after a trial of closed reduction. Owing to the poor neurological recovery in patients with the complete deficit and increased surgical morbidity in cases of circumferential fixation, anterior reduction and fusion were sufficient to maintain spinal alignment.<sup>8</sup> However, the patients without deficit may require a circumferential reduction and fixation to prevent any neurological deficit. The advantages of circumferential fixation are provision of a rigid construct and increased stability, which prevent neurological deterioration. Thus, a single-stage procedure involving anterior discectomy, posterior reduction and fixation followed by anterior fusion with instrumentation should be considered in such cases.<sup>8</sup>

Alternatively, Dahdaleh *et al*<sup>9</sup> recommended anterior fusion and fixation to those who have had a successful intraoperative reduction and only those who had demonstrable instability after anterior fixation required posterior fusion, thus, indicating the importance of stability to decide the fixation methodology.

In the current case, spondyloptosis at cervicothoracic junction compounded the spinal instability and, therefore, needed rigid fixation, which was achieved with anterior and posterior fusion. However, fixation methodology and sequence are to be tailored to the patient-specific fracture pattern to bring out the best possible results. It is, therefore, very important to carefully evaluate and manage such cases with meticulous planning on an emergency basis.

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## Patient's perspective

I never realised the gravity of my situation, until my team of doctors explained to me the detailed nature and severity of the injury. I am thankful to have gotten my surgery, where they aligned my spine at the earliest to prevent any neurological damage. Currently, I can do all my routine activities without any problems.

## Learning points

- ▶ Traumatic cervical spondyloptosis without neurological deficit is rare.
- ▶ Undue or excessive manipulation during the reduction of the spinal columns should be avoided to prevent any neurological deterioration.
- ▶ Adequate fixation and functional realignment of the spine are key to achieve a favourable outcome.

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