

## CASE REPORT

# Spinal Cord Contusion and Quadriplegia in a Patient with Klippel-Feil Anomaly

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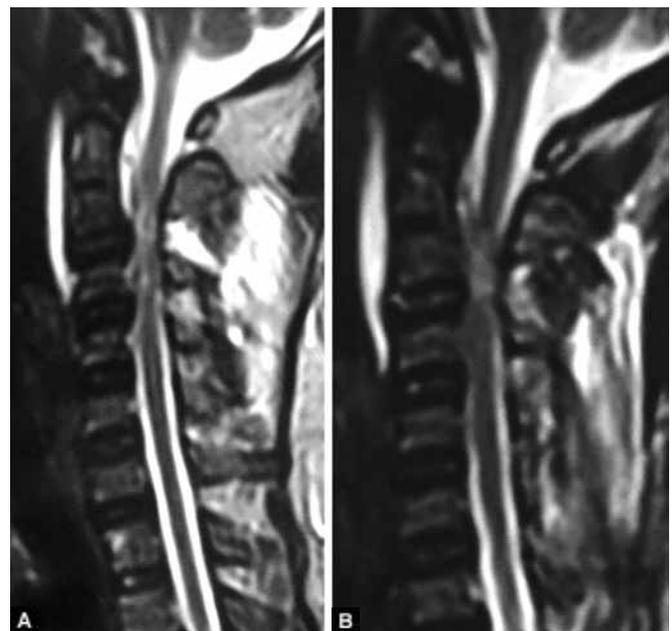
## CASE REPORT

A 43-year-old male presented with quadriplegia after a motor vehicle accident. On examination, there was no motor function detected in his upper or lower limbs. Deep tendon reflexes were absent and he could not detect sensory stimuli below C4. His lab work was normal. X-rays of the cervical spine showed fusion of C2-3, consistent with Klippel-Feil syndrome (Figs 1A and B). An MRI showed cord contusion at C3-4 level with a significant disk herniation and severe cord compression (Figs 2A and B). The patient underwent an anterior cervical discectomy and fusion. He had minimal neurologic recovery postoperatively and was ultimately totally dependent for activities of daily living.

Patients with Klippel-Feil syndrome are born with congenital osseous fusions of the cervical spine due to a failure of segmentation during development. These patients are especially prone to cervical cord injury after a minor fall or traumatic episode due to the altered mechanical properties of the spine.<sup>1-9</sup> The congenital fusions alter the way decelerating and rotatory forces are transmitted through the cervical spine, increasing the probability of spinal cord injury with trauma.<sup>4,6-9</sup> There are multiple mechanisms that make these patients more prone to spinal cord trauma. The incidence of spondylotic and discogenic changes at the junctional segments is increased because motion segments adjacent to the fusion levels become hypermobile.<sup>3-6,9,10</sup> This can result in symptomatic cervical disk herniation with



**Figs 1A and B:** (A) Lateral X-rays and (B) CT scan of the cervical spine showing C2-3 vertebral body fusion with waist formation



**Figs 2A and B:** Magnetic resonance image T2-weighted sagittal images showing a large contusion at C2-3 level in the spinal cord with canal stenosis and C3-4 disk prolapse causing the compression of the dural sac

spinal cord injury.<sup>5,6,9,10</sup> The increased rate of spondylosis can also lead to cervical spine stenosis, which subsequently increases the likelihood of developing spinal cord injury in KFS patients even after minor trauma.<sup>6,11</sup> Management of KFS patients with spinal cord injury depends on the severity of instability, the presence of spinal cord compression and associated neurological deficits.<sup>9,12,13</sup> In the present case, the patient had Klippel-Feil anomaly at C2-3, with herniation

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of the C3-4 disk and canal stenosis at the fused segments. These changes significantly increased his risk of developing a spinal cord injury even after trivial trauma.

## REFERENCES

1. Agrawal A, Badve AM, Swarnkar N, Sarda K. Disc prolapse and cord contusion in a case of Klippel-Feil syndrome following minor trauma. *Indian Journal of Orthopaedics* 2009;43:210-212.
2. Hensinger RN, Lang JE, Macewen GD. Klippel-Feil syndrome a constellation of associated anomalies. *The Journal of Bone and Joint Surgery* 1974;56:1246-1253.
3. Guille JT, Miller A, Bowen JR, Forlin E, Caro PA. The natural history of Klippel-Feil syndrome: clinical, roentgenographic, and magnetic resonance imaging findings at adulthood. *Journal of Pediatric Orthopaedics* 1995;15:617-626.
4. Karasick D, Schweitzer ME, Vaccaro AR. The traumatized cervical spine in Klippel-Feil syndrome: imaging features. *American Journal of Roentgenology* 1998;170:85-88.
5. Pizzutillo PD, Woods M, Nicholson L, MacEwen GD. Risk factors in Klippel-Feil syndrome. *Spine* 1994;19:2110-2116.
6. Vaidyanathan S, Hughes PL, Soni BM, Singh G, Sett P. Klippel-Feil syndrome—the risk of cervical spinal cord injury: A case report. *BMC Family Practice* 2002;3:6.
7. Matsumoto K, Wakahara K, Sumi H, Shimizu K. Central cord syndrome in patients with Klippel-Feil syndrome resulting from winter sports: report of three cases. *Am J Sports Med* 2006;34:1685-1689.
8. Strax TE, Baran E. Traumatic quadriplegia associated with Klippel-Feil syndrome: discussion and case reports. *Archives of physical medicine and rehabilitation* 1975;56:363-365.
9. Samartzis D, Lubicky JP, Herman J, Kalluri P, Shen FH. Symptomatic cervical disc herniation in a pediatric Klippel-Feil patient: the risk of neural injury associated with extensive congenitally fused vertebrae and a hypermobile segment. *Spine* 2006;31:E335-338.
10. Adeleye AO, Akinyemi RO. Cervical Klippel-Feil syndrome predisposing an elderly African man to central cord myelopathy following minor trauma. *African Health Sciences* 2010;10:302.
11. Prusick V, Samberg L, Wesolowski D. Klippel-Feil syndrome associated with spinal stenosis: a case report. *Journal of Bone and Joint Surgery American volume* 1985;67:161-164.
12. Tracy M, Dormans J, Kusumi K. Klippel-Feil syndrome: clinical features and current understanding of etiology. *Clinical Orthopaedics and Related Research* 2004;424:183-190.
13. Neroni M, Gazzeri R, Galarza M, Alfieri A. Intradural cervical disc herniation in a Klippel-Feil patient. *Spine* 2007;32:E608-E610.