Introduction
Fracture dislocations of thoracic and lumbar vertebrae are commonly encountered and are a result of high velocity trauma (Fig 1) [1]. Surgical treatment poses challenge in terms of safe and effective reduction maneuvers. Various techniques have been diversely described in literature for reducing highly unstable thoracolumbar fractures. We describe a novel reduction maneuver which is slow, steady and graded technique using four parallel rods and vice grips. We believe that this technique is easy to perform and reproducible, tailor made and maintains sagittal and coronal balance of spine in such unstable situations. These surgeries are done for mainly early mobilization with a stable spine understanding that the neurology will rarely improve.

Surgical technique:
1) The patient is positioned prone very carefully taking care to prevent further neurological insult. Maintaining the lumbar lordosis can help in partial vertebral reduction.
3) Pedicles identified and screws are inserted at two levels above and below the level of dislocation bilaterally (Fig 2a). Role of assistant surgeon is very important in view of giving the counter traction and support the completely shattered spine while inserting pedicle screws. We have seen the shortening of the column because of overlapping of two diseased ends.
4) Two small rods are applied: one below the level of injury and other above (Fig 2b). Once the rods are secured, a three step maneuver is performed. Two rods are held securely by two vice grips and gentle, slow and sustained distraction applied across the vertebrae (Fig 2c). With distraction maintained the surgeon gently pushes the anteriorly displaced proximal column and pulls the distal column (commonly encountered situation where proximal column is anteriorly displaced with respect to distal one) leading to unlocking and disimpaction of dislocated vertebrae. Now opposite forces are applied pulling the proximal column and pushing the distal column to achieve reduction of facet joints bilaterally (Fig 2d). The reduction is checked under fluoroscopy. Sham rod is immediately fixed before the check image.
5) Care should be taken to avoid unnecessary jerky and violent movements. Any bony or soft tissue structures obstructing the reduction should be cleared before attempting reduction.
6) The operating surgeon maintains the reduction and the assistant applies rod on the opposite side and temporarily fixes the

A Novel Reduction Maneuver for Highly Unstable Thoraco-Lumbar Fracture Dislocation: Technical Note

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Abstract
Thoracolumbar fracture dislocations are devastating injuries caused by high velocity trauma. Reduction of such highly unstable situations poses great surgical challenge to treating surgeon. Various reduction maneuvers are described diversely in literature. We describe a simple and easily reproducible vice grip-parallel rod technique which provides excellent reduction and maintains sagittal alignment. It is safe and minimizes additional neural injury. These surgeries aim at early and better mobilization with and without wheelchair of the patient and understanding the chances of neurological recovery are extremely low.

Key Words: thoracolumbar fracture, dislocation, reduction, technique
vertebral column in this position. Now the temporary rods are
removed and another long rod is applied on other side too (Fig 2e).
7) Complete decompression is performed at injured level and
neural elements checked for any breach and repaired. Cross links
applied.
8) Autografts from laminae and spinous process along with iliac
crest bone graft used to enhance fusion.
9) We recommend a CT scan with reconstruction in every case
possible along with X rays and MRI scans (Fig 2f,g).

The patient is mobilized as per tolerance with help of brace from
second postoperative day in most of the cases.

Discussion
Fracture dislocations of vertebral
column are highly devastating
injuries and are caused as a result
of high velocity trauma. These
are commonly seen due to road
traffic accidents, fall from height
and are often facilitated by risk
factors like rheumatoid arthritis
etc [1,2]. The mechanism of
such injuries varies and is usually
a combination of flexion-
distraction, translation-shearing
or hyperextension injuries [1,3].
Reduction of thoraco-lumbar
vertebral fracture dislocations
are diversely described in
literature. Closed reduction
technique using cotrel frame was
described initially [4]. However recent trend is shifted towards
open reduction which enables us to see neural elements directly
and allows adequate decompression. Open reduction techniques
described involved direct manual reduction, interspinous lamina
spreaders etc [5,6,7]. However they are associated with high failure
rates, therefore more aggressive techniques including facetectomies,
laminectomies etc are now employed.
Our technique described, provides excellent means of reducing
highly unstable vertebral dislocations with minimal risk of neural
injury. It provides graded, sequential reduction after securing
proximal and distal anchorage points (small rods). Although this
technique significantly aids in reduction, it should be remembered that it can be difficult at times to replace temporary rods with longer rods. As it is one under vision, it's easy to be safe while doing this manoeuvre. We keep a detailed neurological chart and ASIA impairment scale.

Conclusion

We believe that this technique provides safe and easy way to achieve reduction and maintain sagittal alignment. It is easily reproducible, but we would like to emphasize the importance of a experienced surgeon to prevent additional neural injury while manipulation. Also we would like to mention that this technique is aimed at stabilization for wheelchair mobilization and understanding neurological damage and recovery. This technique helps in avoiding the unnecessary bone cutting/osteotomies as well as shortening procedures and reduces morbidity as it reduces significant time also in difficult reductions.

References


How to Cite this Article


Video of this technique is available online. Please visit www.ijsonline.co.in