Reduction of traumatic dislocation of the cervical spine with locked facets

Technical note

RALPH B. CLOWARD, M.D.
Honolulu, Hawaii

The author describes a method and an instrument for reduction of dislocated cervical vertebrae. This technique is particularly useful when the facets are locked.

KEY WORDS: dislocated cervical vertebra • locked facets

Locked facets of the cervical spine result from improper reduction of a traumatic anterior dislocation of one cervical vertebral body on another (Fig. 1 left). In a severe flexion injury, if traction is applied with the neck in extension, the articular process of the upper vertebra becomes impinged in the notch of the lower facet, making further reduction impossible (Fig. 1 right). When positive neurological signs are present, unlocking the facets is necessary to reduce the dislocation and restore maximum diameter to the spinal canal. If the patient with locked facets has minimal or no evidence of spinal cord or nerve root involvement, one may be tempted to leave the condition untreated. This is unwise as a progressive dislocation and myelopathy may result.

Taylor and Evans described a technique for rapid reduction of cervical dislocations by body traction and manual manipulation. This method was replaced with the introduction of skull traction. Locked facets can occasionally be reduced by skull traction alone but surgical reduction may be necessary. When the posterior approach is used, if reduction cannot be accomplished by levering the facet into position, facet removal becomes necessary. This adds to the instability of the spine and requires posterior fusion. When the anterior approach is used, the dislocation can be reduced with skull traction alone or by using a vertebral spreader. The technique for unlocking the facets anteriorly was first described in 1961 and later modified.

Our successful treatment of a patient with an unusual cervical dislocation suggested a new surgical technique and instrument which we are now reporting.

Case Report

A man injured in a high-speed automobile collision was admitted to the Neurochirurgische University Clinic, Mainz, West Germany, on June 16, 1971. He had complete motor loss below T-2 but retention of voluntary motor function in both hands and
arms. Lateral tomograms disclosed dislocation at C7-T1; the entire body of C-7 was anterior to the body of T-1 (Fig. 2 *left*).

After skull traction failed to change the position of the dislocation or the neurological status, the anterior surface of the spine...
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was exposed through a transverse supraclavicular incision. Because of the low level, the dislocation could not be identified either by portable x-ray or when exposed surgically. This led to removal of the wrong disc, C6-7. The cervical spine was drawn cephalad with 40 kilos of skull traction until the C7-T1 interspace was exposed. After removing the disc material from this interspace, it was found that the body of C-7 was surprisingly mobile and could be rotated clockwise in a vertical plane with the vertebra spreader placed in the anterior third of the C6-7 interspace. A large wedge-shaped bone graft was inserted at this level. When the spreader opened the C7-T1 interspace the counterclockwise rotation of C-7 moved it into perfect alignment, reducing the locked facets. A large bone graft inserted at this level secured the spine in normal position (Fig. 2 right).

Cervical Dislocation Reducer

We discussed our case with Dr. Johann Rusdea, an orthopedic surgeon in Weisbaden, Germany. He gave us a prototype instrument he had designed to reduce dislocation of the cervical spine. The mechanical principle of his instrument was to exert a simultaneous push-and-pull action

Fig. 3. Top: Photograph of the cervical dislocation reducer. Bottom: Drawing illustrating the surgical technique used for reducing dislocation with locked facets. The cervical vertebral spreader (S) rotates the vertebral body (V) and the reducer (R) realigns the spine.
on the spine with a single movement. A cogwheel was placed between two long arms and engaged with ratchet teeth on opposing surfaces so that when it was turned the arms moved in opposite directions.

Based on this principle a new instrument which we have called a “cervical dislocation reducer” was designed (Fig. 3 top).* The end of the short arm has a hook with one pin. The large cogwheel, when turned with a thick handle bar, applies considerable force to the dislocated vertebral body in the vertical plane. At operation the disc is cleaned out at the level of the dislocation and the interspace opened with skull traction or the vertebra spreader. The posterior longitudinal ligament is separated from the posterior superior margin of the lower vertebra with an angulated elevator.† The hook on the long arm is inserted under this ligament and secured to the posterior margin of the lower vertebral body. The foot plate on the short arm is placed against the anterior surface of the vertebral body above the dislocation (Fig. 3 bottom). When the handle is turned counterclockwise the lower vertebral body is pulled forward and simultaneously the upper vertebra is pushed backward, reducing the dislocation and realigning the vertebral column (Fig. 4). The reduced dislocation is fixed in position by securing the arms of the reducer with a set screw. To remove the instrument the set screw is released and the foot plate is raised by turning the handle clockwise and disengaging the hook. Anterior dislocation, regardless of its severity, can be reduced with this instrument. The interbody fusion is then performed using a vertebral spreader.‡ If the articular facets are locked, the technique described in our case report is used.

References

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* Cervical Dislocation Reducer manufactured by Codman & Shurtleff, Inc., Randolph, Massachusetts.
† Osteophyte Periosteal Elevator manufactured by Codman & Shurtleff, Inc., Randolph, Massachusetts.
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Address reprint requests to: Ralph B. Cloward, M.D., 338 Alexander Young Building, Honolulu, Hawaii.