# COTREL-DUBOUSSET (CD.) INSTRUMENTATION APPLICATIONS EARLY RESULTS.

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*This is a preliminary report on Cotrel-Dubousset (CD.) instrumentation. From Nowember 1989 though March 1990, 13 patients were treated at Ankara University Ibni Sina Hospital, Orthopaedic Surgery and Traumatology Department with CD. insturmentation. 4 patients had surgical treatment of spinal deformity associated with other disorders. The remaining 9 patients had idiopathic scoliosis. No postoperative external support was used. Ambulation began on the third postoperative day and the patients were instructed to resume their normal activity gradually.*

*Key Words : Cotrel-Dubousset (CD.) instrumentation Idiopathic scoliosis*

Cotrel and Dubousset introduced a new spinal surgery instrumentation system consisting basically of three elements; the rod, the hooks and screws and the transverse traction device (DTT). Crosslinkage of the two rods provides a rectangular configuration with added strength. The system permits distraction, compression, direct approximation of the apical vertebra to the midline and derotation.

## OPERATIVE TECHNIQUE FOR THORACIC CURVES

Moderate, flexible, right thracic lordo-scoliosis is one of the best indication for CD. instrumentation. If the curve is flexible and corrects well on the side bending roentgenograms, instrumentation is between the upper and lower neutral vertebrae. Correction is achieved mainly by rotation of the pre-bent rod, on the concave side. The shape of the rod will vary with the level of the curve

For example for T5-L1 curve:

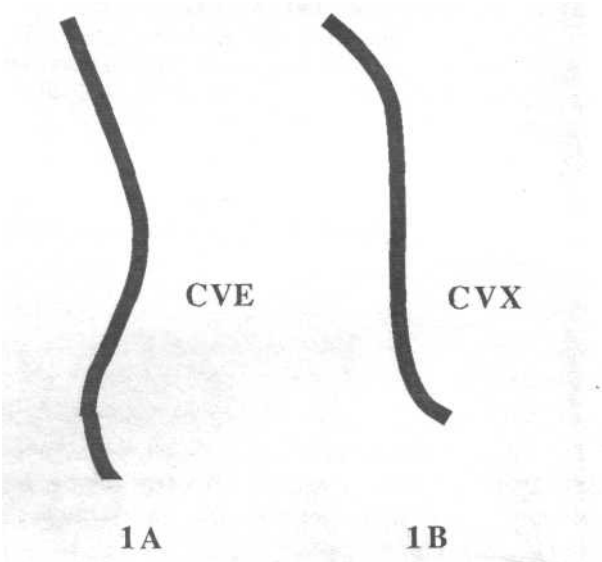


FIGURE 1 : Bending of the rods.
1A : Concave rod
1B : Convex rod

Concave rod is bent forwards in its upper 4/5 to re store the thoracic kyphosis and backwards in the lower 1/5 to conform to the begining of the lumbar lordosis, (Figure 1A) Convex rod is bent forwards and back wards in its upper and lower 1/5 and the section in be tween is left straight so that it can exert forward pres sure at the apex. (Figure IB)

**PREOPERATIVE PLANNING:** (Figure 2)

Upper end vertebra (T5) is determined and always instrumented on both sides, on concave side closed

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pedicular hook and on convex side pediculo-transverse claw (closed pedicular hook and transverse hook) is placed. Apical vertebra (T9) will take an open pedicular hook on convex sides. Two above and two below the apical vertebra (intermediate vertebra), T7 will take an open pedicular hook and Til will take an open lumbar or thoracic laminar hook in supralaminar position on concave side. The lower end vertebra is again instrumented on both sides, on convex side hook is placed infralaminar and on concave side supralaminar position. On both sides closed lumbar laminar hook is used. Prebent concave rod is seated first. The rod is then rotated between 90-120 degrees, so that the contour is converted from a scoliotic deformity to a saggital curve. The convex rod is seated next, the rods are then secured to each other with two DTT joined at each end just below the upper hooks and just above the lower hooks. This provides a rectangular configuration, enchancing its overall strength.

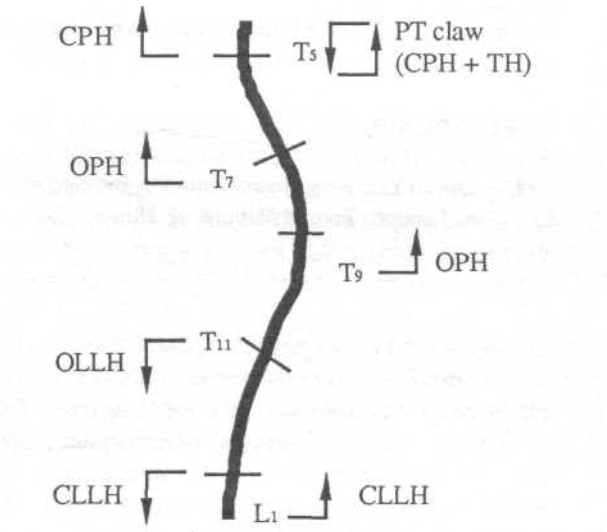



**FIGURE 2 :** Preoperative planning of a T5-L1 thoracic curve. Arrows indicate the direction of the hooks.

CPH : Closed pedicular hook
TH : Transverse hook
OPH : Open pedicular hook
OLLH : Open lumbar laminar hook
CLLH : Closed lumbar laminar hook

## MATERIAL AND METHODS

From November 1989 through March 1990,13 patients had posterior spinal instrumentation with CD. instrumentation at Ankara University Ibni Sina Hospital Department of Orthopaedic Surgery and Traumatology. 4 patients had surgical treatment of spinal deformity associated with other disorders and the remaining 9 patients were diagnosed as having juvenile or adolescent idiopathic scoliosis. (Table 1)

Table-1: The type of spinal deformity of 13 patients

| | |
|---|---|
| Idiopathic adolescent scoliosis | 7 |
| Idiopathic juvenile scoliosis | 2 |
| Congenital scoliosis | 1 |
| Paralytic scoliosis | 1 |
| T12 pathologic fracture | 1 |
| Lumbar kyphosis | 1 |
| Total | 13 |

No postoperative external support was used. Ambulation began on the third postoperative day, gradual resumption of normal activitcs was allowed at six weeks and full activities other than contacts sports, were allowed after three months.

## RESULTS

For 9 patients with idiopathic scoliosis, the curve patterns are listed in Table 2.

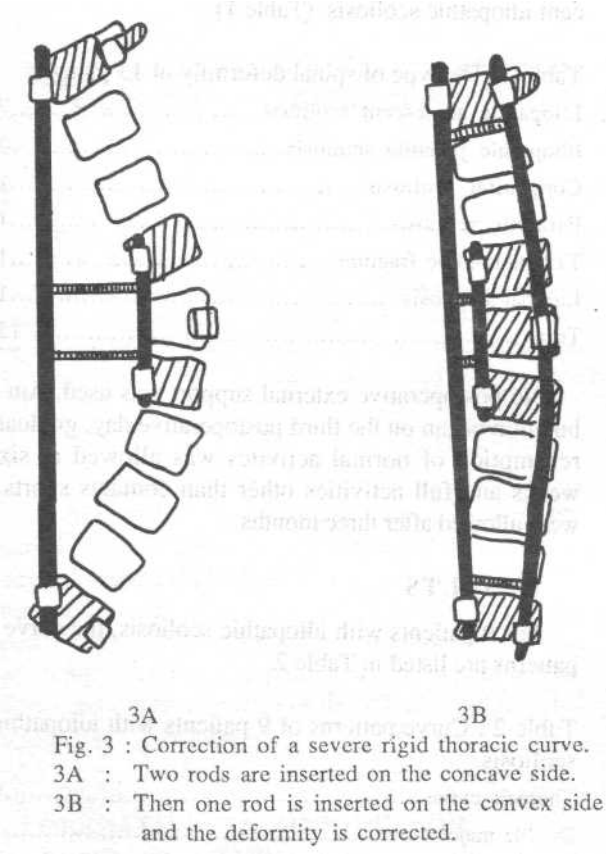
Table-2 : Curve patterns of 9 patients with idiopathic scoliosis.

| | |
|---|---|
| Thoracic curve | 8 |
| Double major curve | 1 |
| Total | 9 |

The average preopcrative curve of these 9 patients were measured 50.7 (range 36-94)degrees. The bending correction averaged 29.3 (range 8-82) degree, with postoperative curvature averaging 21.3 (range 6-64) degrees.

Thoracic kyphosis was measured by the Cobb angle between the uppermost discernible vertebral body and the inferior edge of T12. Before operation this averaged 28.2 (range 10-82) degrees compared with 27.3 (range 10-56) degrees postop. Specifically, 4 of these 9 patients showed no significant change in thoracic kyphosis. (A measured change of 4 degrees or less) 3 patients had increased, whereas 2 patients had decreased kyphosis after operation.

There were no intraoperative complications and to date there have been no wound infections. One patient had a neurologic complication. After the operation, motor function was lost in her left foot, but sensation was intact. Motor function recovered in 8 weeks.



3A 3B

Fig. 3 : Correction of a severe rigid thoracic curve.
3A : Two rods are inserted on the concave side.
3B : Then one rod is inserted on the convex side and the deformity is corrected.

One patient with severe rigit juvenile idiopathic scoliosis was corrected by the use of two rods on the concave side, a long one between the end vertebrae and a shorter one between the intermediate vertebrae. Distraction force was applied to each rod. Then the two rods were approximated by 2 DTT's. (Figure 3A) On the convex side a prebent rod was inserted under compression. Finally, the two long rods were anchored together at their ends by 2 DTT's. (Figure 3B)

## DISCUSSION

This article presents the authors limited experience with CD. instrumentation in the surgical treatment of idiopathic thoracic scoliosis.

In correction of idiopalhic scoliosis with CD. instrumentation, polysegmental fixation, with two hooks, roods and DTT's forms a rigid rectangular frame, that increases the strength of the system.

The average correction of the curves was noted to be % 58.

This compares favorably with other published reports of scoliotic correction by Harrington distraction instrumentation.

The follow-up period of these 9 patients ranged from one to five months, thus it is too early to discuss loss of correction over time. However we are correction of idiopathic thoracic scoliosis. The instrumentation effectively corrects the scoliatic deformity three dimensions.

The sability, achieved, makes the use of postoperative external fixation unnecessary.

## REFERENCE :

1 . Cotrel Y. : New Instrumentation for Surgery of the Spine. London, Freund Publishing House, 1986.