

TREATMENT OF THORACOLUMBAR UNSTABLE FRACTURES WITH TRANSPEDICULAR FIXATION SYSTEMS

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ABSTRACT :

Sixty-nine patients with thoracolumbar vertebrae fracture who admitted to 2nd Orthopaedics Clinic of Ankara Numune Hospital from January, 1990 to August, 1993 and who treated by posterior instrumentation and fusion either with Dick or Alici, were reviewed.

43 male and 26 female patients whom ages range from 15 to 63 years (mean 32,2 years) were followed minimum 4, maximum 46 months (mean 22 months).

Mean sagittal index were 22.5 preoperatively, 9.5 postoperatively and 11.5 at final follow-up.

Key Word : *Thoracolumbar vertebra fracture, transpedicular fixation systems, Dick, Alici.*

Thoracolumbar spine injuries occur frequently and the consequences of inapropriate treatment are devastating. Optimal treatment of the fractures of the thoracic and lumbar spine still remains controversial. The advantages of internal fixation of unstable fractures are well documented but the type of fixation device that is most desirable is less well defined. Various authors have advocated non operative immobilisation, posterior surgical instrumentation with or without posterolateral decompression, ant anterior decompression with or without instrumentation for these injuries (1, 2, 3, 5, 6, 7, 8, 9, 12, 13, 15, 16, 17, 18).

We present our recent 4 year experience with the treatment of 69 thoracolumbar fractures using transpedicular fixation systems; Dick and Alici. We evaluate the results of two surgical treatment methods.

MATERIALS AND METHODS

Sixty-nine patients with unstable thoracolumbar vertebrae fracture who admitted to 2nd Orthopaedic and Traumatology Clinic of Ankara Numune Hospital from January, 1990 to August, 1993 were treated in a prospective, consecutive series with Dick and Alici.

There were 43 male (% 62) and 26 female (% 38). Their ages ranged from 15 to 63 years (mean 32,2

years) injuries occurred from the T11 to L4 levels; 5 patient had a fracture at T11, 20 patients at T12, 24 at L1, 10 at L2, 3at L3, 6 at L4 and 1 at L5.

They were assessed with a detailed history, physical examination, plain lateral and AP radiographs and CT scans. A functional assessment using the Frankel grading system was performed.

21 patients were injured in motor vehicle accidents, 5 were crushed by car, 5 had falls from tractor 34 had falls, 4 sustained direct trauma.

Evaluation and consideration for surgery were based on radiographic evidence of spinal instability based on the three column spinal model Denis modified by ferguson and Allen (4, 11).

Using a standard posterior midline approach, the levels above and below the injured segment were exposed. Pedicular placement was accomplished using anatomic landmarks and confirmed by plain intraoperative radiographs. Posterior fusion was performed routinely.

All patients were encouraged to ambulate on the first or second postoperative day, depending on concomitant injuries and neurologic deficit.

Pre operative, post operative and final sagittal index were calculated. This index is defined as the measurement of segmental kyphosis at the level of a mobile segment, that is one vertebra and one disc, adjusted for

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Table 2. Distribution of Pre-Operative Sagittal Index Values

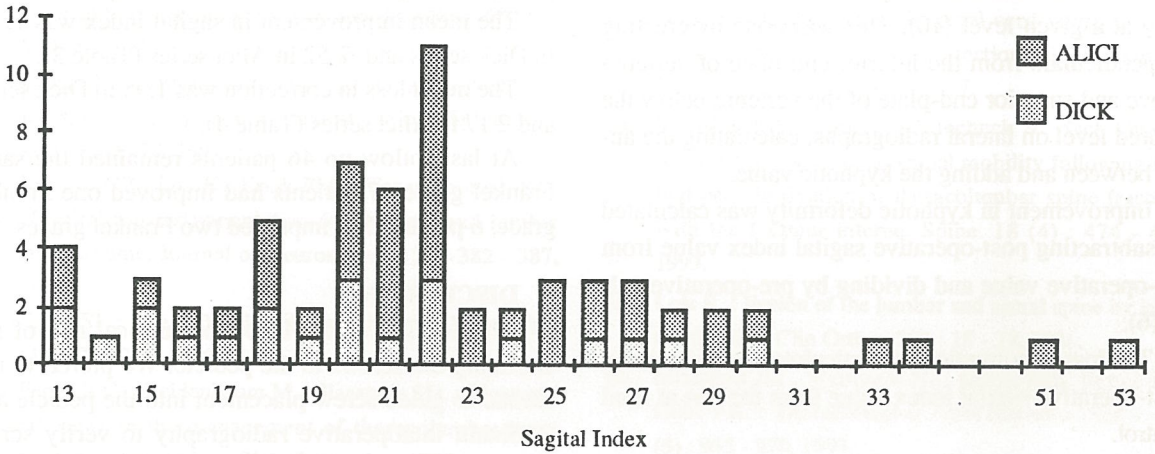


Table 3. Improvement In Kyphotic Deformity

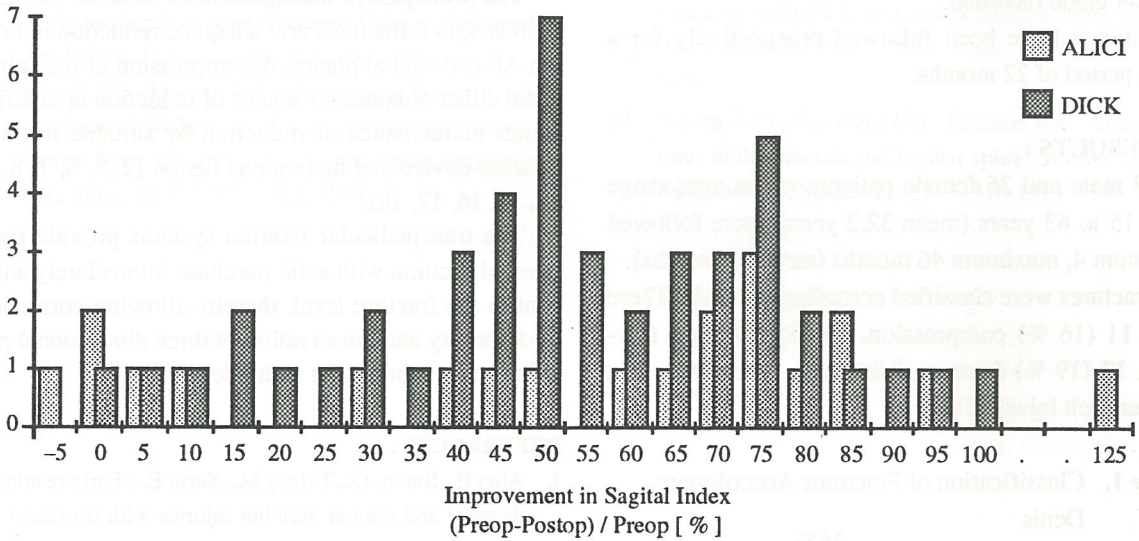
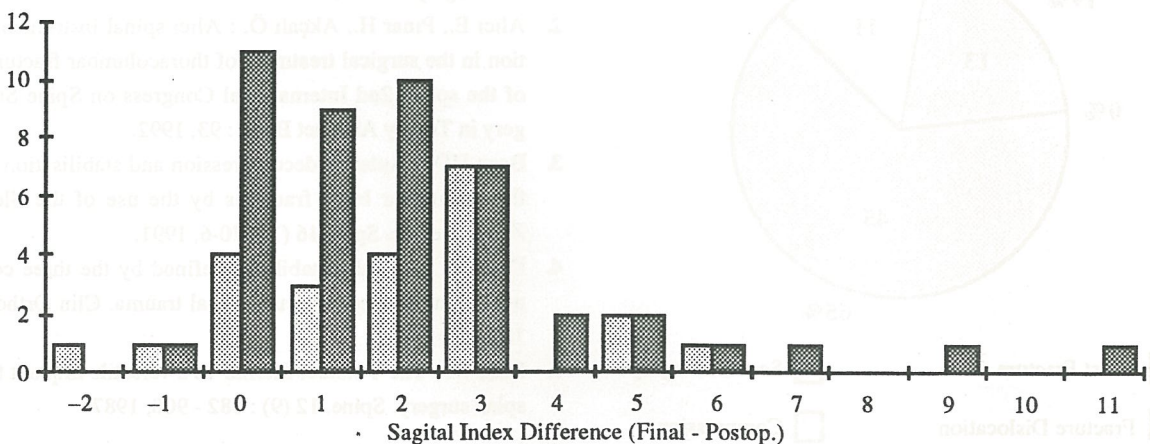


Table 4. Loss In Correction of Kyphotic Deformity



the baseline sagittal contour at the level in the normal spine. This measurement represent the total net deformity at a given level (10). This was done by erecting perpendiculars from the inferior end-plate of vertebra above and superior end-plate of the vertebra below the injured level on lateral radiographs, calculating the angle between and adding the kyphotic value.

Improvement in kyphotic deformity was calculated by subtracting post-operative sagittal index value from pre-operative value and dividing by pre-operative value (6).

The loss in correction was calculated by subtracting post-operative sagittal index value from the one at final control.

Patients were thoroughly re-examined and the Frankel grade recorded.

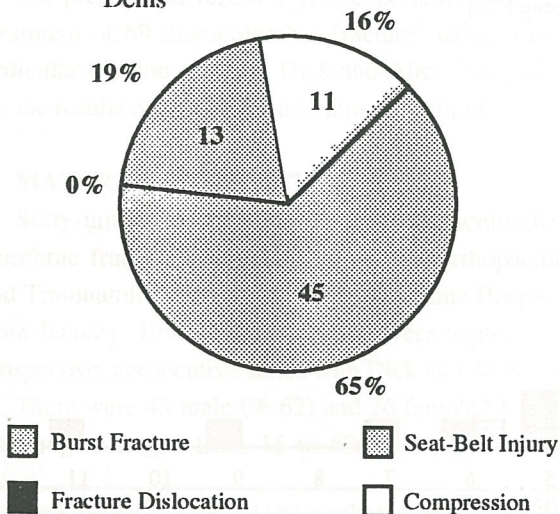
Patients have been followed prospectively for a mean period of 22 months.

RESULTS :

43 male and 26 female patients whom ages range from 15 to 63 years (mean 32,2 years) were followed minimum 4, maximum 46 months (mean 22 months).

Fractures were classified according to Denis. There were 11 (16 %) compression, 45 (65 %) burst fractures, 13 (19 %) fracture dislocation. There were not any seat belt injury (Table 1).

Table 1. Classification of Fractures According to Denis



Mean sagittal index were 22.5 preoperatively, 9.5 postoperatively and 11.5 at final follow-up (Table 2).

The mean improvement in sagittal index was % 57 in Dick series and % 52 in Alıcı series (Table 3).

The mean loss in correction was 1.95 in Dick series and 2.17 in Alıcı series (Table 4).

At last follow-up 46 patients remained the same Frankel grade 17 patients had improved one Frankel grade, 6 patients had improved two Frankel grades.

DISCUSSION :

All pedicle systems incur the surgical risk of not confining the screws to the pedicle. We prefer, to use curette to guide screw placement into the pedicle and to obtain intraoperative radiography to verify screw placement. There were only 5 screw out of pedicle.

The principles of management of unstable thoracolumbar spinal fractures are; adequate reduction in both the AP and sagittal planes, decompression of the spinal canal either obtained by means of reduction or anterior routes maintenance of reduction by suitable internal fixation device and meticulous fusion (2, 5, 6, 7, 8, 9, 12, 14, 16, 17, 18).

The transpedicular fixation systems provide rigid internal fixation with solid purchase immediately adjacent to the fracture level, thereby allowing correction of deformity and preservation of three dimensional position while minimising fusion levels.

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