follow up was 18 months. None of the patient's underwent removal of implants.

3. Analysis

Cases which had undergone surgery were regularly followed up postoperatively for a minimum of 1 year to gather information regarding clinicoradiological outcome of the surgery. Fusion and stability was assessed clinically by subjective pain and neurological manifestation assessment using VAS and Beaujon scale[15,16].

3.1 VAS Scoring

VAS or visual analogue scale is a subjective scale to assess the amount of pain in an individual. Operationally a VAS is usually a horizontal line, 100 mm in length having values from 0 to 10. It canbe divided for assessment from no to severe pain.
No to mild: 0-2
Moderate: 3-6
Severe: 7-9
Worst: 10

3.2 Beaujon's Scale

Originally scale was given for spinal stenosis but we have used it to detect and compare the neurological status of the patient. It comprises of the below assessment points.

		1	2	3	4
Walking	< 100 m	100-500 m	> 500 m	No Limitation	
Rest sciatica	Continuous	Crisis	Moderate	None	
Effort sciatica	Continuous	Moderate	None		
Back Pain	Continuous	Crisis	Moderate	None	
Neurological status	Major deficit		Moderate		None
Medications	OMS 3	OMS 2	None		
Quality of life	Impossible			Normal	

Figure 1: BEAUJON'S scale

Interpretation of Score

- Max post op score can be 20
- (post-op score – pre-op score)/20 – pre-op score)
- Score is interpretated as follows

> 70% gain: very good result
40 to 70% gain: good result
10 to 40% gain: poor result
< 10% gain: failure

Functional outcome was assessed by using Prolo's scale. The maximum follow up scores were compared with the pre-operative scores.

3.3 Prolo's Scale

To assess the functional outcome of the patients Prolo's scale was used. Prolo's scale include questions to assess functional and economic status.

Score	Criteria
functional status	
1	total incapacity
2	mild to moderate level of low-back pain &/or sciatica
3	low level of pain & able to do everything except sports
4	no pain, but has had >1 recurrence of low-back pain or sciatica
5	complete recovery w/o recurrent pain, no activity restriction
economic status	
1	complete disability
2	no gainful occupation but can do housework or some retirement activities
3	able to work but not at previous occupation
4	able to work at previous occupation but w/ restrictions or limited status
5	able to perform previous occupation w/o restrictions

Figure 2: Prolo's scale

Interpretation
Scores of functional and economic status are added and interpreted as follows

- >9 : excellent results
- 5-8: moderate
- <4: poor results

Fusion assessment
1. Absence of loosening of implants in both anteroposterior and lateral views will be an indirect evidence of fusion in short term follow up
2. Features of consolidation of graft
3. Presence of fusion in patients with more than 1 yr follow up

4. Case Example

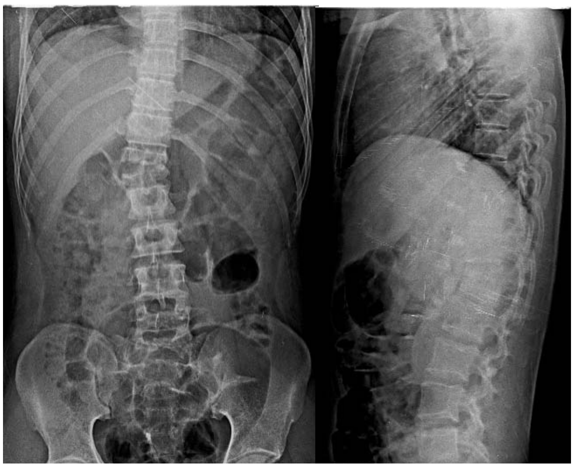


Figure 3,4: pre-operative radiographs

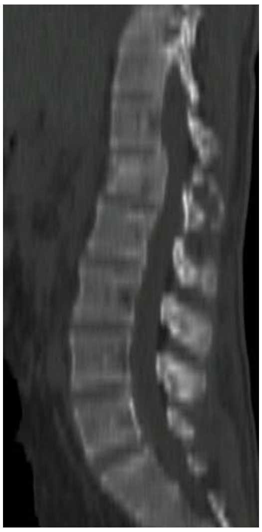
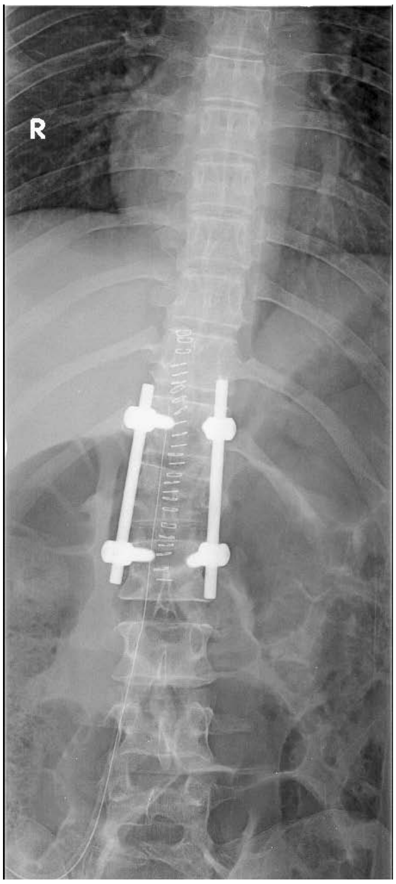


Figure5.6: Pre-operative CT scan



Figyre 6,7: post operative radiographs

5. Observations

Sex predilection
Among 20 patients, 15 were males and 5 were females

Age
Majority of patients in our study were among the age group of 20 to 45 years with mean age of 32.65 years.

VAS score
Out of 20 patients, preoperatively 19 patients had severe pain which reduced to moderate in 4 patients, absence of pain in 3 patients and 13 patients having mild pain. This shows that 80% of the patients had significant improvement in pain.

Beaujon's score
It showed very good results in 4 patients and good results in 15 patients suggesting that 95% of the patients had significant improvement in the functional status post surgery.

Prolo's scale
Functional outcome was also correlated pre-operative to postoperatively by prolo's score which showed moderate to excellent outcome in 95% of patients.

Sl No.	Age/Sex	Vertebral fracture	Pre Op prolo's	Pre Op VAS	Post Op VAS	Post Op Beaujon	Post Op Prolo score	Follow up
1	27/F	T12	poor	severe	mild	good	exc	1yr
2	29/M	L5	poor	severe	mod	good	mod	2yr
3	23/M	L1	poor	severe	mild	V. good	exc	1yr6mon
4	36/M	L1	poor	severe	no	v. good	exc	1yr8mon
5	45/M	L4	mod	severe	no	v.good	exc	1yr2mon
6	60/M	L2	poor	severe	mod	poor	poor	1yr
7	30/F	L1	poor	severe	mild	good	mod	2yr
8	21/F	L3	mod	severe	mild	good	mod	2yr
9	22/M	T4,T5,T6	poor	severe	mild	good	mod	3yr
10	26/M	T10	poor	severe	mild	good	mod	1yr
11	21/M	L1	mod	mod	no	v.good	exc	1yr4mon
12	40/M	T12	poor	severe	mild	good	mod	1yr
13	38/F	L2	poor	severe	mild	good	mod	1yr6mo
14	42/M	L1	poor	severe	mild	good	mod	1yr5mon
15	36/M	T10,T11	poor	severe	mild	good	mod	1yr7mon
16	21/M	L1	poor	severe	mild	good	mod	1yr
17	29/M	L1	poor	severe	mild	good	mod	1yr10mon
18	39/M	T11	poor	severe	mod	good	mod	1yr
19	23/M	L2	poor	severe	mod	good	mod	2yr
20	45/F	T12	poor	severe	mild	good	mod	1yr

*all scores are at the maximum follow up period

6. Discussion

Operative treatment has several advantages over bed rest and immobilization[17]. Immediate spinal stabilization is achieved in patients who cannot tolerate bed rest and immobilization. In the multiply injured patient, prolonged bed rest predisposes to severe and life threatening complications like bed sores, sepsis, aspiration and lower respiratory tract infections. Surgical stabilization also allows the patient to sit upright, transfer to a wheelchair, and start rehabilitation earlier, with fewer complications[18]. Surgical treatment more reliably restores sagittal alignment, translational deformities, and canal dimensions than bed rest and immobilization[19]. Finally, even though there is insufficient evidence to prove the point, some clinical studies have suggested that surgical decompression more reliably restores neurologic function[15,16]. Short-segment pedicle instrumentation is the most widely practiced approach now used for thoracolumbar and lumbar fractures around the world[19].

Short segment instrumentation works by a cantilever mechanism and depends on integrity of the anterior column in order to maintain sagittal balance[17].Short-Segment Pedicle Screw Instrumentation (SSPI) direct reduction of sagittal deformity andtranslation while immobilizing the shortest possible segmentof the lumbar spine, thereby minimising adjacent level degeneration.[20]Recent studies have shown anatomic reduction can be obtained by specific manipulationsof the pedicle screw constructs can lead to better stability. The pedicle screw construct provides three-column fixation to the vertebral body, allowing for simultaneouscorrective forces to be applied in axial compressionor distraction, flexion or extension, and inrotational, coronal, and sagittal translation. Oda andPanjabi returned a thoracolumbarburst fracture to optimal anatomic alignment by a combination of distraction and hyperextension manoeuvres, pure compression forces tended to result in greatest stability.[21]Injudicious over distraction during fracture reduction can displace bony elements, causingserious neurologic injury. Late collapse and fatigue failure can occur duringposterior reconstruction ofsevere burst fractures, without restoring the anterior weight-bearingcolumn due to excessive cantileverbending forces[21]. Restoration of thoracolumbar lordosis at the time of surgery is essential, or the forces of weight-bearing fall anterior to the lumbar spine and pelvis, imparting an exaggerated flexionmoment to the construct and predisposing it to implantfailure.Technique and constructdesign cannot alter the damage done to the spinalcord at injury, either, and functional outcomes are mostprofoundly dependent on neurologic integrity.

7. Complications

None of the patients had any superficial or deep wound infections. There were no neurologicalcomplications related to surgery, or in pedicle screw placement. None of the patients required resurgery. One patient complained of persistent radicular pain because of multiple degenerative disc disease associated with the fracture giving poor outcome after surgery.

8. Conclusion

At review all patients had a minimum follow up of 1 year with a mean follow up of 1.5 years. The Cobb angle, percentageloss of anterior body height and percentage loss of midsagittalcanal diameter, at injury, post-fixation and at review were assessed.This was correlated against VAS, Prolo's score and Beaujon score. We found in our study that short segment fusion had good efficacy for thoracolumbar fractures. It helps in correcting kyphosis (sagittal axis) and accomplishes fusion with minimal complications and post-operative morbidity. We successfully achieve solid fusion with good mechanical alignment in majority of the patients with very good functional status at a minimum of 1year follow-up.

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Author Profile

Dr. Ravi Kumar T.V. studied MS Orthopaedics from KIMS HUBLI, Fellowship in spine from Amrita Institute of Medical Sciences currently working as Assistant professor in Department of Orthopaedics in MS Ramaiah medical college.

Dr. Daksh Gadi (corresponding author) studied MBBS from SMIMS, Gangtok. Currently MS Orthopaedic Resident in Department of Orthopaedics in MS Ramaiah medical college, Bangalore, Karnataka.

Dr. Madhava Pai studied MBBS from KMC, Manipal. Currently MS Orthopaedic Resident in Department of Orthopaedics in MS Ramaiah medical college, Bangalore, Karnataka.

Dr. Raghavendra Rao studied MS Orthopaedics from Bangalore medical college, Bangalore. Previously working as Assistant Professor in Department of Orthopaedics in MS Ramaiah medical college, Bangalore. Currently working as a spine surgeon in Sparsh hospital, Bangalore.