

Treatment of Osteoporotic Vertebral Collapses of the Thoracolumbar Spine with Neurologic Deficits using Anterior Approach

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– Abstract –

Study Design: Retrospective

Objectives: To evaluate the clinical and radiological results of treatment for thoracolumbar spine fractures, with neurological deficits, using an anterior approach in a senile osteoporotic spine.

Summary of Background Data: With osteoporotic vertebral collapses, an operative treatment may be indicated for lesions that are considered unstable, especially if there is spinal canal compromise with neurological deficits. As for the treatment of these cases, a posterior approach destabilizes, and increases, the kyphotic deformity, resulting in the need for a longer fusion period. A combined anterior-posterior approach increases the morbidity. A one stage anterior decompression and anterior reconstructive stabilization is often the most reasonable operative choice.

Materials and Methods: Between January 1999 and August 2001, 12 cases of thoracolumbar osteoporotic vertebral collapse, with neurological deficits, were performed. There were 10 female and 2 male cases. The mean age for the patient was 69.3 years, ranging from 60 to 79 years. The numbers of each level of fractured vertebrae were; 2, 5, 4 and 1, in eleventh thoracic, twelfth thoracic, first lumbar and second lumbar vertebrae, respectively. All patients reported minor injury or trauma, and the average interval between injury and operation was 8.3 months, ranging from 1 to 36 months. There were 4 and 8 cases of neurological deficits in the Frankel D2 and D3 groups, respectively. The average preoperative local kyphotic angle was 23.8 °, ranging from 5 to 35 °; with a 66% loss in height, ranging from 42 to 83%). The average T score from the Bone Densitometry was -3.7 S.D., ranging from -3.2 to -4.4.

The operations were performed by an extrapleural-retroperitoneal approach. The anterior instrumentation was performed with the Kaneda system and a titanium mesh cage. All cases were followed for more than 12 months.

Results: All cases had a solid bony fusion. The immediate postoperative average local kyphotic angle was 10.3 °, ranging from -14 to 22 °, and the correction loss at the last follow-up was 2.6 °, ranging from 0 to 9 °. All 12 patients with incomplete preoper-

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ative neurological deficits improved, postoperatively, to Frankel group E.

Conclusions: The one stage anterior spinal decompression and reconstruction, with a Kaneda instrument and a titanium mesh cage, afforded enough stability in patient with an osteoporotic vertebral collapse to enable early ambulation and to achieve realignment and solid fusion, and seems to have merit in the neurological recovery following an operation.

Key Words: Thoracolumbar spine, Osteoporosis, Neurologic deficits, Fracture treatment, Anterior approach

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 Modified Frankel Grade
 MRI
 가
 6,8,10,13,14,15)
 1999 1 2001 8
 12 가
 1
 1.
 1999 1 2001 8
 , 1 가 12
 (Table 1).
 가 2 , 가 10 ,
 69.3 (60 , 79) ,
 12 가 5 (42%) 가 , 1 4 , 11
 2 , 2 1 .
 10 가 .
) , 8.3 (1 , 36
 ,
 17 (12 , 23)
 .

2.
 Bradford McBride²⁾
 가
 3.
 11 , .

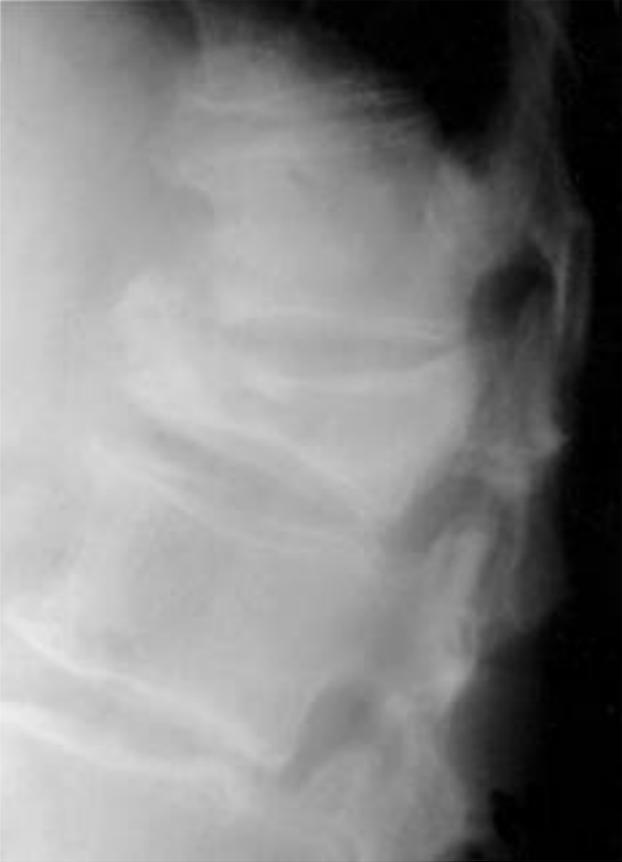


Fig. 1. Preoperative lateral view shows first lumbar vertebral fracture with kyphotic deformity of 35 °angulation.



Fig. 2. MRI mid-sagittal view shows retropulsed bony fragment into spinal canal.

Table 1.

Case	Fracture site	Fracture type*	BMD	Interval between Fx. and Treatment	F/U duration	Modified Frankel Grade		Kyphotic Angle (°)		Height Loss (%)	
						Preop.	Postop.	Preop.	Final	Preop.	Final
1	T ₁₁	UB	-3.5	2	18	D ₃	E	19°	7°	80	41
2	T ₁₁	SB	-3.6	6	15	D ₂	E	20°	14°	78	30
3	T ₁₂	UB	-3.2	5	23	D ₃	E	32°	17°	83	33
4	T ₁₂	UB	-3.3	1	14	D ₃	E	14°	8°	50	17
5	T ₁₂	WC	-4.1	1	12	D ₃	E	17°	12°	42	3
6	T ₁₂	SB	-3.2	2	15	D ₂	E	22°	8°	81	36
7	T ₁₂	UB	-3.3	1	16	D ₃	E	23°	6°	77	36
8	L ₁	UB	-3.7	36	14	D ₂	E	23°	19°	56	20
9	L ₁	UB	-3.8	8	17	D ₂	E	35°	18°	80	30
10	L ₁	WC	-4.4	36	15	D ₃	E	34°	7°	66	24
11	L ₁	SB	-4.4	1	12	D ₃	E	32°	22°	52	0
12	L ₂	WC	-3.9	1	21	D ₃	E	5°	-14°	47	6
Mean			-3.7	8.3	17			23.8°	10.3°	66	23
											8
											25

* WC : Wedge Compression, SB : Stable Bursting, UB : Unstable Bursting

Cobb 23.8 (5 , 35) , 10.3 (-14 , 22) , (Fig. 2). T
 2.6 (0 , 9) , -3.8 S.D. ,
 58%) 77%(59%, 100%) , 가
 4%) , Frankel E 18 °
 가 가 가 1 , (Fig. 3-A, B),
 가 1 (Fig. 4-A, B).

72 8 가
 Frankel D2 ,
 1 35 ° (Fig. 가 7).

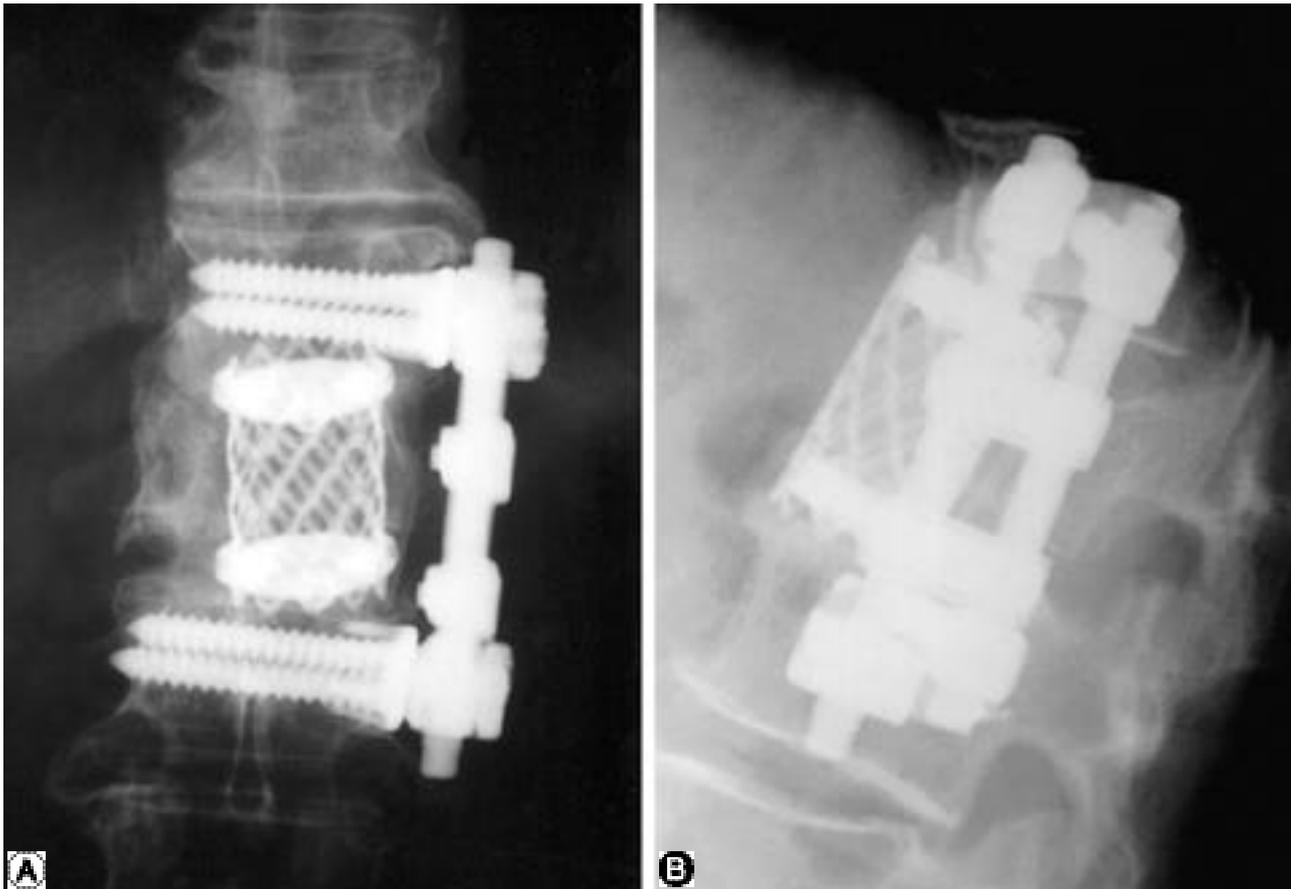


Fig. 3-A, B. Radiographs at 17 months after operation demonstrates good union with correction of deformity.

7,8,13,14)
Kempinsky 가 8) 6,8,10,13,14,15)
가 , Shikata 14)
Harrington 6-7
Kaneda 5,6)
Kaneda 6) Salomon 13) Cotrel-
Dubousset
Bradford McBride²⁾가
Frankel Frankel D2 4 , D3 8
Frankel E 가 Kostuik 10,11)
가

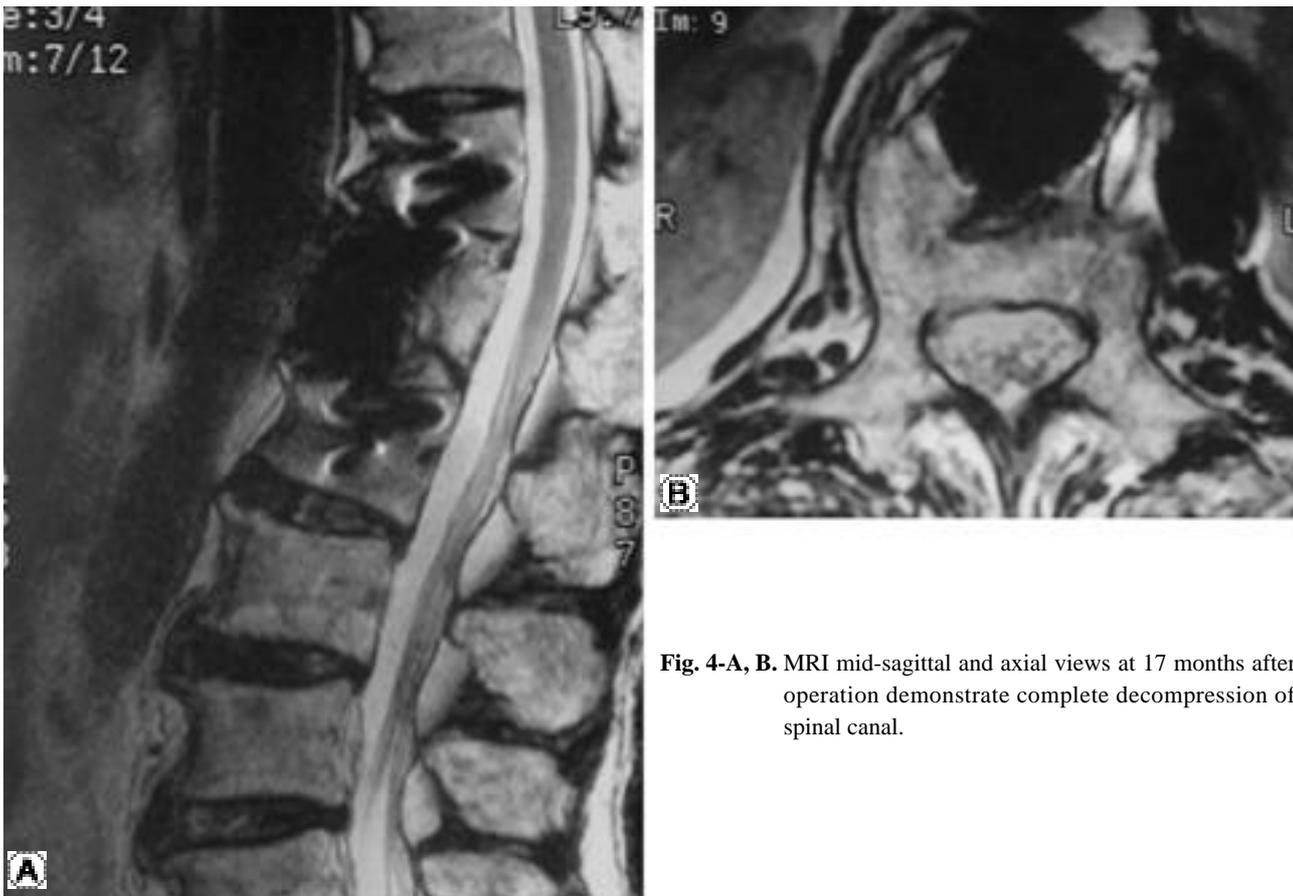


Fig. 4-A, B. MRI mid-sagittal and axial views at 17 months after operation demonstrate complete decompression of spinal canal.

Gurr⁴⁾ 가 가 1
가

Arciero¹⁾

Yamamuro¹⁶⁾

가
12

Kaneda⁶⁾

가
Riew Rhee¹²⁾

1.
가 2. 23.8 (5, 35) 12.9 (-13, 22) 34% (17%, 58%) 75% (59%, 99%)

3 가

3. 1
4.

Gurr⁴⁾ 가 가 가

가 가 , Zdeblick¹⁷⁾ 가 가

가

Kaneda⁶⁾ 가

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15)

Kim⁹⁾ Sung

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Cho³⁾

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: (titanium mesh cage) 가

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: 1999 1 2001 8 가

12 2 , 10 , 69.3 (60
 , 79) . 11 2 , 12 5 , 1 4 , 2 1 .
 가 , 8.3 (1 , 36) .
 , Frankel Grade D2 4 , D3 8 .
 23.8 (5 , 35) , 66%(42%, 83%) .
 - 3.7 S.D.(- 3.2 S.D., - 4.4 S.D.) . 11 ?

: 3 40 900 cc Frankel Grade E
 . 10.3 (-14 , 22) .1

2.6 (0 , 9) 가 가 1 , 11 가
 가 1

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