

## Reconstruction of Lumbar Kyphosis with circumferential Fusion by Posterior-Anterior-Posterior Approach

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### – Abstract –

**Study Design :** Six patients with the lumbar kyphosis who underwent the circumferential fusion by posterior- anterior- posterior method were reviewed retrospectively from January 1998 to June 1999.

**Objectives :** To determine whether patients with lumbar kyphosis can be successfully treated by circumferential fusion by posterior- anterior- posterior method.

**Summary of Literature Review :** In the lumbar kyphosis, many procedures have been reported to correct the deformity, including multiple osteotomy, transpedicular vertebral resection, posterior interbody fusion, etc. Circumferential fusion by posterior- anterior- posterior method is suggested in this report as a valuable technique for excellent deformity correction and maintenance.

**Material and Methods :** The surgery consists of posterior structural release with decompression followed by anterior structural release with interbody fusion by use of bone graft and posterior fixation. Clinical and radiologic results of the lumbar lordosis, sacral inclination and C7 plumb- line were assessed.

**Result :** The mean segments of anterior and posterior fusion were 2.8 and 3.5 respectively. All clinical symptoms of patients had been improved in more than good. The average angle of lumbar lordosis was corrected from kyphosis 2.8°, preoperatively to lordosis 31.2°, postoperatively. At the last follow- up, the average loss of correction was 2.3°. The average angle of sacral inclination was corrected from 6.7° to 50.8°. The distance from supero- posterior corner of S1 to C7 plumb line was reduced from 11.0 cm to 2.75 cm.

**Conclusion :** The circumferential fusion by posterior- anterior- posterior method offer an effective surgical treatment, which produce excellent deformity correction, fusion rate, maintenance of the correction and good clinical outcome.

**Key Words :** Lumbar, Kyphosis, Anterior and posterior fusion

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\* 2000 17

5~7 mm

titanium mesh cylinder

## 3. 가

가

C7 (C7 plumb line) S1  
(postero-superior corner of S1)Cobb  
(sacral inclination) 1, 2  
7

3

Kirkaldy-Willis<sup>10)</sup>

1.

1998 1 1999 6

1 6

1, 5  
59.3 ( 55 ~ 64 ) 50 가 4 ,

60 가 2

3 ,

2 , 1 Kirkaldy-Willis<sup>10)</sup> 4 , 2

(stooping)

2.8

3.5

2.8 31.2

12

30

34.0

23

28.9

2.3

6.7

2.

50.8

44.1

(Table 1).

C7

S1

11.0 cm

(Table 2).

(same day surgery) 2 ,  
(staged surgery) 4

2.75 cm

8.25 cm

6

**Table 1.** Anterior and posterior fusion of lumbar kyphosis

Age/Sex (yrs)	Dx	Lumbar lordosis(°)			Sacral inclination(°)		
		preop	postop	correction	preop	postop	correction
64/F	FBSS*	ky: 1	lor: 23	24	8	52	44
64/F	FBSS*	ky: 7	lor: 32	39	7	56	49
58/F	DLK†	ky: 9	lor: 35	44	9	60	51
55/M	PTLK‡	lor: 5	lor: 37	32	10	45	35
59/F	DLK†	ky: 3	lor: 31	34	5	43	38
56/F	DLK†	ky: 2	lor: 29	31	1	49	48
59.3(Avg)		ky: 2.8	lor: 31.2	34	6.7	50.8	44.1

\* FBSS: Failed back surgery syndrome  
† LDK: Lumbar degenerative kyphosis  
‡ PTLK: Post-traumatic lumbar kyphosis

**Table 2.** Anterior and posterior fusion of lumbar kyphosis

Age/Sex (yrs)	Dx	C7 plumb-line(cm)		
		preop	postop	correction
64/F	FBSS*	8.0	3.0	5.0
64/F	FBSS*	12.0	1.5	10.5
58/F	DLK†	19.0	4.5	14.5
55/M	PTLK‡	8.5	3.0	5.5
59/F	DLK†	11.0	2.5	8.5
56/F	DLK†	7.5	2.0	5.5
59.3(Avg)		11.0	2.75	8.25

# C7 plumb line : distance from supero-posterior corner of S1 to C7 plumb line

1 (external iliac vein)  
, 1  
(paralytic ileus)

64 4  
가  
8  
·  
1 , 8 ,  
( 8 2 ) 15 ,  
C7 S1 8.0 cm  
3, 4 5

(Fig. 1).

2, 3, 4, 5



**Fig. 1.** Radiograph shows the lumbar kyphosis (1°) with spondylolisthesis L3 on L4 for the previous failed back surgery syndrome.

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7  
titanium mesh cylinder  
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가  
 23 , 52 ,  
 C7 S1 3.0  
 cm (Fig. 2).  
 2  
 7  
 (Fig. 3).

가  
 가  
 1.4,9,14)



**Fig. 2.** Postoperatively, trunk was well balanced with lordosis (23°).



**Fig. 3.** 2 years later, radiograph shows solid bony union and no loss of the correction.

7,9,11,18)

1 3 , 2 , , 13)

2.6

45.8  
가

가

(stooping)

가

가 24) Takemitsu 23)

1 2 가

1 1 Cobb 20 80

(PLF & PLIF)

Stagnara 21) Takemitsu 23)

가

Jackskon McManus<sup>6)</sup>

C7 S1  
(sacral inclination)

3,11)

가 , 4

1 가 17,18)

C7 가 ,

34.0 (

2.8 - 31.2 ), 가 ,

44.1 ( 6.7 -

50.8 ), C7 S1 17)

8.25 cm( 11.0 cm -

2.75 cm)

12), 2,15,16,20,22) 3,5,7,11,17,18)

titanium mesh cylinder

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가

가 2.8 31.2

34

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 , C7 S1 .  
 : 2.8 3.5 .  
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 . 2.8 31.2 34.0  
 28.9 2.3 6.7 50.8  
 44.1 C7 S1 11.0 cm  
 2.75 cm 8.25 cm .  
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