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## Cage

# Surgical Treatment of Isthmic Spondylolisthesis: Pedicle Screw Fixation, Posterolateral Fusion, and Posterior Lumbar Interbody Fusion with Cage after Wide Decompression

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– Abstract –

**Study Design:** A retrospective study.

**Objectives:** To verify the advantages of adding gentle reduction and posterior lumbar interbody fusion (PLIF), using a cage to the usual posterolateral fusion (PLF), with pedicle screw instrumentation, in the surgical treatment of spinal stenosis with isthmic spondylolisthesis.

**Summary of Literature Review:** The stabilization of isthmic spondylolisthesis, following decompression, is difficult. The PLIF, with a cage, offers anterior column support, reduction and a broad fusion base.

**Materials and Methods:** 31 patients were treated with wide decompression, pedicle screws fixation, PLF and PLIF, and followed up for more than 1 year. The degrees of slippage were grades I and II in 20 and 11 patients, respectively. The grade I patients were treated with gentle reduction of the slippage in the disc space, using a leverage maneuver with a Cobb's spinal elevator. The grade II patients were treated with the insertion of a pedicle screws, fixation of rods, reduction and distraction, and then insertion of a cage. After the procedure all the patients were evaluated for the reduction of spondylolisthesis, restoration of the disc space, radiological bony union and clinical results.

**Results:** Ninety percent of the patients were rated as excellent or good. Fusion of the PLIF occurred in all patients. The average reduction in the spondylolisthesis was 42.6 and 47.8% in the grade I and II patients, respectively. The average restorations of the disc spaces were 46.9 and 100.2% in the grade I and II patients, respectively. The maintenance of the reduction and disc height were excellent in the final follow-up radiographs.

**Conclusions:** Adding gentle reduction and PLIF, using a cage, to the usual posterolateral fusion, with pedicle screw instrumentation, in the surgical treatment of spinal stenosis, with isthmic spondylolisthesis, showed satisfactory results in the reduction of

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the spondylolisthesis, the restoration of the disc height, the bony union and clinically.

**Key Words:** Isthmic spondylolisthesis, Reduction, Posterior lumbar interbody fusion, Posterolateral fusion

2.

가 , 6 , 30 (96.7%), 31 (100%), 24 (77.4%), 15 (48.3%)

가 7 , 가 6 .

3.

4, 5 10 , 5 1

16 , 3, 4, 5 2 , 4, 5

3 Meyerding

grade I (1 ) 20 , grade II (2 ) 가 11

Cloward<sup>4)</sup>

4.

31 , (Fig. 1), (Fig. 2).

17).

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5.

Gill (floating lamina) (towel clip)

(Cobb 's spinal elevator) (en block)

1.

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grade I 1

cage

1

가 가 31 , 38

69 52.3 , 26 , 5

가 , 12 36 2 grade II

25 . cage



**Fig. 1.** Preoperative flexion-extension lateral radiographs of 59-year-old female shows grade II isthmic spondylolisthesis at L4-5 level.



**Fig. 2.** Magnetic resonance imaging in sagittal plane shows angulated and compressed dural sac and severely compressed nerve root at L4-5 intervertebral foramen.

1 . . . . . 1 . . . . . 7. . . . . Kirkaldy-Willis<sup>11)</sup> 가 . . . . . (excellent), . . . . . (good), . . . . . (fair), . . . . . (poor) . . . . . cage . . . . . cage (Stryker . . . . . (Sofamor Danek, Novus cage) 4 , . . . . . OIC cage) 27 . . . . . 가 (Fig. 3). . . . . 가 , . . . . . 가 . . . . . cage . . . . . 가 . . . . . 6. . . . . 3 . . . . . (TLSO) . . . . . 2 . . . . . 3 . . . . . , . . . . . 6 , 3 , 6

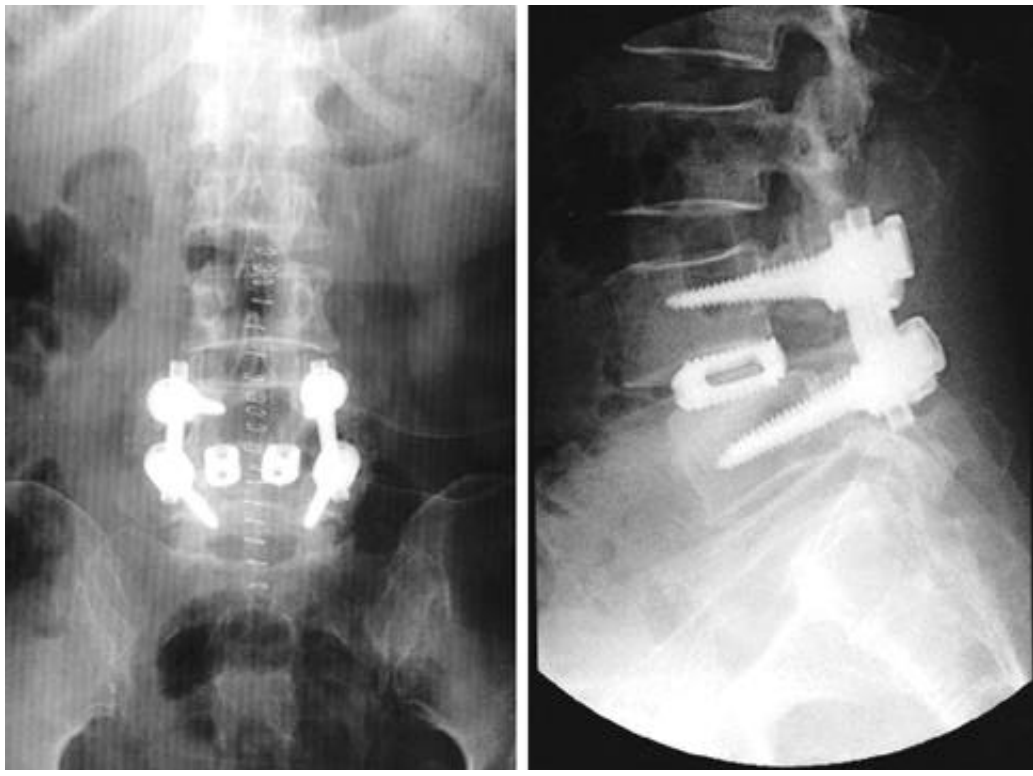


Fig. 3. After wide decompression, reduction, PLIF with cage, pedicle screw instrumentation and PLF were done.

4-5%

23)

1 11 , 7 ,  
2 , 2 7 , 3 , 1

1 42.6 % , 2 47.8 %  
(P=0.11).

1 46.9 % , 2 100.2 %  
가가  
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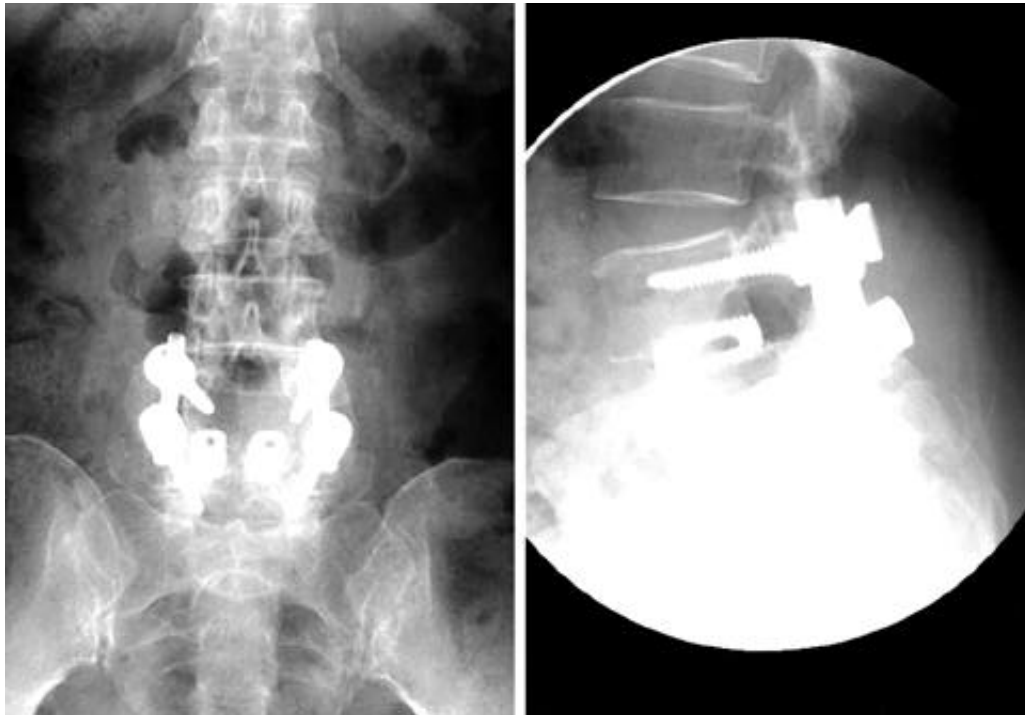


Fig. 4. Radiograph at 12 months follow-up examination shows reduction and restoration of disc height was well maintained with solid bony union.

가 . . . . . 가

load-sharing mechanism . . . . .

tension-band mechanism . . . . . cage 4

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9,10,15,22) 18) , cage ,

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24) cage 가

. Goh<sup>8)</sup> cage

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3,20) .

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가 , 6) , cage

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3,4,5,6,19) ,

가 ,

31 .

가 grade I . . . . .

가 , 가 ,

grade II . . . . . cage

cage , grade I

cage , grade II

가 cage ,

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 Kirkaldy-Willis 가 , ,  
 , Meyerd-  
 ing grade I 20 , grade II가 11 . Gill , grade I  
 (1 ) cage  
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 cage  
 : 18 , 10 , 3  
 1 42.6%, 2 47.8% 2  
 가 1 46.9%, 2 100.2% 가 ,  
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255-2

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