

# High-grade (Grade III) Degenerative spondylolisthesis at L4/5 Treated Successfully by Transforaminal Interbody Fusion (TLIF): A Case Report

S Fukuta, K Miyamoto, M Yoshida, H Kodama, Y Kanamori, H Hosoe, K Shimizu

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## Abstract

We report a rare case of High grade degenerative spondylolisthesis. Degenerative spondylolisthesis is not necessarily rare. However the degree of degenerative spondylolisthesis rarely exceeds Meyerding grade II. The patient 66 years old female present exceed Meyerding Grade III degenerative spondylolisthesis with back pain and gait disturbance for over 20 years. Conservative treatment had no effect. Functional radiographs CT and MRI of the lumbar spine revealed the high grade slippage of L4/5 hypermobility and cauda equine was severe compressed. There was not spondylolysis at L4 lamina. The Bilateral facetectomy and partial reduction and transforaminal lumbar interbody fusion (TLIF) at L4/5 was performed, the back pain disappeared and her neurological deficit and activity of daily living ameliorated. There has not been any adjacent level degeneration after 4 years after TLIF operation.

## INTRODUCTION

Degenerative spondylolisthesis is common in individuals over age of 50. Previous studies have indicated that this condition occurs four times more frequently in women than men and is most commonly seen at L4-L5[1]. The degree of degenerative spondylolisthesis rarely exceeds Meyerding[2] grade I or grade II[3]. It remains controversial whether surgical treatment of high-grade spondylolisthesis, irrespective of whether it is isthmic or dysplastic, should consist of in situ fusion[4] or reduction and fusion[5].

Here, we present a very rare case of Myerding Grade III degenerative spondylolisthesi with back pain and gait disturbance treated successfully by partial reduction and transforaminal lumbar interbody fusion (TLIF)

## CASE REPORT

66-year-old woman, who had been suffering from back pain for over 20 years, and had received conservative treatment. In 2003, her back pain became more severe and could not remain in a sitting position for more than 20 min. She had intermittent claudication with bilateral thigh pain. Conservative treatment, including epidural injections and nerve root block, did not relieve the pain in this patient, and

she was referred to our clinic. On physical examination, there was obvious knocking pain and tenderness at the L4-L5 level, and numbness in both buttocks and posterior-lateral thighs. Lateral plain X-ray films of the spine showed degenerative spondylolisthesis at L4/5 with a slip angle of 20° and 55% slip. (Figure 1) And there was not severe canal stenosis. (Figure 2) At the L4-L5 segment, 10 mm of translation was noted between extension and flexion. The combination of physical and radiographic findings indicated the potential efficacy of surgical fusion of the unstable segment. She had no level of congenital fusion above or below the L4/5 level and had no connective disorder, such as osteogenesis imperfecta, Ehler-Danlos disease, or Marfan's syndrome.

## OPERATION

The patient underwent transforaminal interbody fusion (TLIF) at the L4/5 level in the prone position on a four-pad frame with the hip joints extended to load the lumbar spine. Titanium interbody cages (OIC cage; Stryker Spine, Allendale, NJ, USA) were inserted bilaterally with harvest of the iliac crest bone. The %slip decreased from 55 to 20%, and the slip angle decreased from 25° to 10°. To prevent

intraoperative damage to the L4 and L5 nerve roots, bilateral facetectomy was performed and magnetic evoked potentials (MEP) of the bilateral tibialis anterior muscle were monitored intraoperatively. No abnormal findings were noted during spacer insertion. Finally, a pedicle screw system (ST360; Zimmer Spine GmbH, Münsingen, Switzerland) was used for fixation between L4 and L5.

After the operation, the patient's back pain showed significant amelioration, and radicular pain improved gradually. L1 axis S1 distance decreased to 10 mm, indicating acceptable restoration of sagittal balance[6]. She had no peri- or post-operative complications. At 3 years post-operatively, the patient's back pain and thigh pain have decreased to an almost tolerable level, and she is satisfied with the surgical outcome. Lateral radiographs showed solid interbody bony fusion at L4–5. (Figure 3)

### Figure 1

Plain lateral X-ray of the lumbar spine in the neutral position (A), high grade degenerative spondylolisthesis of the L4–5 segment, Lateral CT-Myelogram shows no severe stenosis, Lateral radiograph at 3 years postoperatively showing that the deformity has been partially reduced and the sagittal alignment improved.



Figure 1



Figure 2



Figure 3

## DISCUSSION

In this report, we described successful surgical treatment of high-grade degenerative spondylolisthesis using TLIF without decompression. Our patient was indicated for surgical treatment not because of the magnitude of spondylolisthesis, but because of the severe neurological impairment, including intermittent claudication[7].

For surgical treatment of degenerative spondylolisthesis, decompression without fusion or posterolateral fusion with instrumentation were initially favored. Although these methods have several disadvantages—progression of slippage in the former[8] and loss of alignment in the latter[9]—they are among the choices for treating this pathological condition. Notably, in the present patient,

because the magnitude of slippage was large and the patient had sagittal imbalance, it was suggested that interbody fusion was necessary to provide anterior column support and solid fusion.

While the majority of authors, including those who prefer fusion or non-fusion, emphasize decompression in surgical treatment of spondylolisthesis, [8, 9]Sailhan et al. showed that posterior instrumented reduction and fusion without decompression can achieve acceptable radiographic and clinical results in high grade spondylolisthesis [10]. TLIF may be advantageous in fusion without decompression, because in this procedure the path to the disc runs diagonal to the vertebral foramen, it is not necessary to retract the dural sheath to the midline, and the posterior laminae can be preserved for fusion [11, 12].

The present patient had a number of serious problems: high-grade spondylolisthesis, aging with osteoporosis, and severe back pain presumably due to instability and unbalanced sagittal alignment. TLIF provided partial reduction and solid fusion, and consequently ameliorated the patient's back pain. Due to use of the transforaminal approach with excision of the bilateral facet joints, disc removal and fusion were performed without dural retraction[11, 12]. The operation successfully relieved her back pain and radicular pain without any complications.

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**Author Information**

**Shoji Fukuta, MD**

Department of Orthopaedic Surgery, Gifu University School of Medicine

**Kei Miyamoto, MD, PhD**

Department of Orthopaedic Surgery, Gifu University School of Medicine

**Minoru Yoshida, MD, PhD**

Department of Orthopaedic Surgery, Gifu University School of Medicine

**Hiroataka Kodama, MD, PhD**

Department of Orthopaedic Surgery, Gifu University School of Medicine

**Yasuo Kanamori, MD**

Department of Orthopaedic Surgery, Gifu University School of Medicine

**Hideo Hosoe, MD, PhD**

Department of Orthopaedic Surgery, Gifu University School of Medicine

**Katsuji Shimizu, MD, DMSc**

Department of Orthopaedic Surgery, Gifu University School of Medicine