



# Multi-level Posterior Lumbar Interbody Fusion Using Ceramic Silicon Nitride & Allograft Bone in a Single Patient

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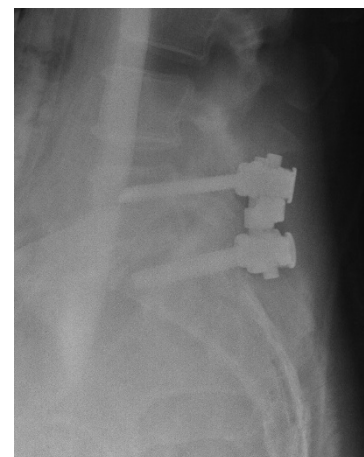
## SUMMARY

A 38 year old, female patient with prior L5-S1 posterior interbody lumbar fusion using allograft bone, underwent follow-up surgeries using silicon nitride implants (Valeo™ PL and Valeo II™ PL). Excellent fusion and clinical outcomes were achieved.

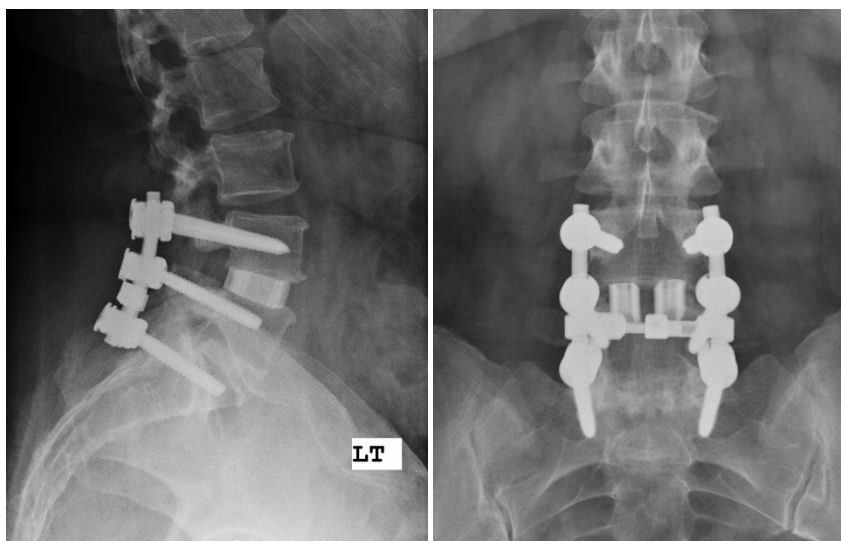
## DIAGNOSIS & PROCEDURE

5 years after previous bilateral L5-S1 PLIF using cortical bone allograft, patient had a nine month history of increasing leg pain of 7 out of 10 and back pain of 5-6 out of 10. Physical therapy, increased medication usage, and other conservative treatments failed to resolve symptoms. Radiographic examination revealed a well healed L5-S1 fusion with grade I spondylolisthesis of 6mm at L4-5 and 3mm motion between flexion/extension. Adjacent level degeneration at L4-5 and lateral recess stenosis were diagnosed following MRI examination.

Surgical intervention consisted of posterior lumbar interbody fusion (PLIF) at L4-5 using ceramic silicon nitride interbody devices (**Amedica Valeo™ PL** - 13mm height, 9x25mm footprint, 6° lordosis), with bilateral instrumentation and previous L5-S1 hardware incorporation.



Preoperative lateral radiograph



Lateral and AP radiographs at 6 weeks postoperative, 1<sup>st</sup> procedure

## RESULTS

At 6 week follow-up, patient felt "best she has in years," reported no leg pain and minimal back pain while not using narcotics or muscle relaxers. Excellent progressive fusion evident on 6 week plain radiographs. Complete radiographic fusion noted at 3 months post-op. Patient was released from care after 8 month follow-up, at which point she was back to work, without pain or the use of any pain medication at all.

## REEVALUATION & 2<sup>ND</sup> PROCEDURE

Three years later, following a fall which resulted in increased right leg pain rated an 8 out of 10, patient returned for evaluation. Radiographic examination revealed excellent L4-5 fusion, however adjacent segment degeneration at L3-4 and retrolisthesis with instability were apparent. Subsequent MRI showed large disc herniation with migration at L3-4 on the right side.

Ceramic silicon nitride PLIF devices (**Amedica Valeo II™ PL** - 12mm height, 9x25mm footprint, 6° lordosis) packed with cellular allograft, were implanted at L3-4 and secured with posterior instrumentation. Prior L4-5 and L5-S1 posterior hardware was removed.

## RESULTS, 2<sup>ND</sup> PROCEDURE

At 6 weeks, patient had no leg pain and minimal back pain. By 3 months, patient continued to recover and did not have any leg or back pain. At 5 months, x-rays showed excellent and complete fusion. The patient returned to work without pain or the use of narcotics.



Lateral and AP radiographs at 5 months postoperative, 2<sup>nd</sup> procedure

resorption of the graft (osteolysis) or pseudarthrosis at the graft-vertebral endplate interface, leading to further instability and the possible need for additional corrective surgery. Also, the harvesting of autologous bone graft from the patient's own iliac crest is associated with considerable postoperative pain.

Silicon nitride's consistent surface structure and strength ensures uniformity in material quality, leading to consistently improved spinal fusion clinical outcomes. The use of silicon nitride avoids the need to harvest bone from the iliac crest, thus eliminating the postoperative pain and risk of further complications associated with that procedure. Silicon nitride's structural consistency is a significant improvement compared to the variability and quality of existing allograft bone implants.

## CONCLUSIONS

This study demonstrates excellent clinical and fusion outcomes using silicon nitride implants in multiple levels of the lumbar spine, while also allowing for the comparison of silicon nitride and allograft bone interbodies in the same patient. The silicon nitride implants healed exceptionally well, with complete fusion as early as 3 months postoperative.

The use of silicon nitride in place of allograft or autograft bone can provide many advantages to both patient and surgeon. For example, due to the variability and inconsistencies of allograft and autograft bone, the structure, density and strength may be insufficient for spinal load bearing pressures. This can result in