

## Fusion outcomes with allograft versus autograft in single and multi-level lumbar interbody fusion operations

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### Introduction

Spinal fusion surgery is used to treat a variety of spinal conditions. A number of techniques are currently employed to achieve the synonymous goal of fusion. One such method is the use of bone graft for osteogenesis, which may be autogenic from the operative site, or allogenic from cadaveric bone. Although similar in fusion rates, allograft material was instituted due to peri- and post-operative complications from autograft harvesting in the 1950s. Allograft is readily available, easy to store, and historically demonstrated decreased donor site morbidity and post-operative complications. However, much heterogeneity exists within the literature concerning which graft material is superior secondary to variation in the anatomical site of fusion, number of levels fused and surgical approach. Our study will focus on patient outcomes by comparing autograft and allograft materials in single and multilevel fusion of the lumbar spine.

### Methods

A retrospective chart analysis was conducted to analyze all patients who underwent transforaminal lumbar interbody fusion (TLIF) operation with the senior author from 2013-2016. Eighty-nine patients were identified who met the inclusion criteria, and divided based on type of graft used, and the number of levels fused.

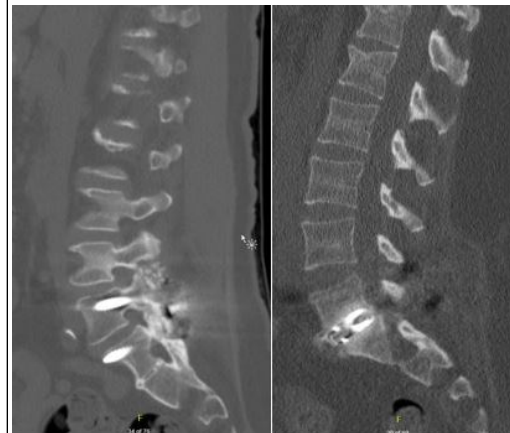
### Discussion

Statistics showed that only the estimated blood loss, and operative time were significantly higher in multi-level fusion operation, independent of graft type. Patient demographics, post-operative hospital stay, pain scores and fusion rates did not differ significantly between groups. The increase in blood loss and surgical time in multilevel disease likely owes to the inherent involvement of multi-level fusion. All patients in our study showed radiographic evidence of fusion at 1 year. Based on our findings, there exists no significant differences in long-term patient outcomes between the use of allograft and autograft based on the number of levels fused intraoperatively in the lumbar spine. The historic hesitancy to use autograft should no longer influence operative planning in specific surgical settings.

### Conclusions

When compared to current literature, this study affirms equivalent peri- and post-operative efficacy in allo- and autograft for single and multi-level fusion of the lumbar spine. Ideally, this outcome data should allow for surgeon preference and patient variability to be taken into account in surgical planning without sacrificing surgical outcomes.

### Sagittal CT of the lumbar spine



Sagittal CT image demonstrating fusion of L4-L5 through the facet joint.

### Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Understand the use of bone graft materials in spinal fusion procedures,
- 2) Understand the advantages and disadvantages of autograft and allograft bone grafts,
- 3) Discuss the difference in outcomes between single and multi-level use of bone graft materials.

### References

1. Schizas C, Tzinieris N, Tsiridis E, Kosmopoulos V, Minimally invasive versus open transforaminal lumbar interbody fusion: evaluating initial experience. *Int Orthop*. 2009 Dec; 33(6):1683-8.
2. Peng CW, Yue WM, Poh SY, Yeo W, Tan SB. Clinical and radiological outcomes of minimally invasive versus open transforaminal lumbar interbody fusion. *Spine*. 2009 Jun 1; 34(13):1385-9.
3. Johnson R. Bone marrow concentrates with allograft equivalent to autograft in lumbar fusions. *Spine*. 2014 Apr 20; 39(9):695-700.
4. Ryu S, Lim J, Kim S, Paterno J, Kim D. Comparison of the biomechanical stability of dense cancellous allograft with tricortical iliac autograft and fibular allograft for cervical interbody fusion. *Eur Spine J*. 2006 Sep; 15(9):1339-45. Epub 2006 Jan 21.
5. Floyd T, Ohnmeiss D. A meta-analysis of autograft versus allograft in anterior cervical fusion. *Eur Spine J*. 2000; 9:398-403.
6. Ryu S, Lim J, Kim S, Paterno J, Kim D. Comparison of the biomechanical stability of dense cancellous allograft with tricortical iliac autograft and fibular allograft for cervical interbody fusion. *Eur Spine J*. 2006 Sep; 15(9):1339-45. Epub 2006 Jan 21.