

Risk Factors for Pseudoarthrosis in mis-TLIF

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Background



- ❑ Lumbar fusions clinical and radiographic successful rates can range from 16% to 95%
- ❑ Approximately 15% of spinal fusions can result in Pseudoarthrosis.
- ❑ Pseudoarthrosis is a common complication that results from failure of bone fusion, typically evident 1yr after attempted spinal fusion
- ❑ Fusion rates in open procedures have been reported to be influenced by many variables including Smoking, DM, RA, NSAIDs, and corticosteroids

Purpose

- ▣ To compare rates of **pseudoarthrosis** between similar cohorts of patients undergoing open vs. mis-TLIF
- ▣ To determine if choice of interbody graft material affects the rate of pseudoarthrosis following TLIF
- ▣ To identify risk factors for pseudoarthrosis following mis-TLIF and compare to open in the literature

Study Design

- ▣ Retrospective Clinical Cohort
- ▣ 308 consecutive patients were reviewed
 - Only patients who had accessible pre-operative x-ray and f/u CT 1yr out were then included for radiographic parameter analysis
- ▣ Outcome measures: **pseudoarthrosis** as identified by postoperative CT scan at >1year follow up
- ▣ Inclusion criteria
 - 1-or-2-level mis- or open TLIF
 - Complete medical records
 - Minimum 2 year follow up
 - Recently updated with soon to be published increased number of mis-TLIF pts

Patient Demographics

	Group 1 - misTLIF	Group 2 - Open TLIF
N	204	104
Average age (range)	51.5 (23-75)	51 (14-74)
Male : Female	125 :79	62 : 42

- ▣ No significant differences between cohorts

Results

- No statistically significant difference in rate of pseudoarthrosis in mis vs. open TLIF cohorts

	misTLIF	Open TLIF	p value
Patients	204	104	
Overall rate of pseudoarthrosis	16/204 (7.8%)	6/104 (5.8%)	0.5

Results – SSD subgroup

- Within each cohort, rate of pseudoarthrosis was higher for with **Same Segment Disease**

misTLIF (SSD)		
No Pseudo	Pseudo	P value
3 (3% SSD)	3 (38% SSD)	<i><0.001</i>

Open TLIF (SSD)		
No Pseudo	Pseudo	P value
2/92 (2.2%)	4/12 (33%)	<i>0.001</i>

Results – Disc Height

- Preoperative **Disc Height** was greater in patients who developed pseudoarthrosis (17mm) than those who did not (6mm) ($p=0.04$)
- Preoperative **Anterior-to-Posterior Disc Height Ratio** was greater in patients who developed pseudoarthrosis (3.6) than those who did not (1.7) ($<p=0.001$)
- Preoperative **Disc Angulation** was greater in patients who developed pseudoarthrosis (16°) than those who did not (4°) ($<p=0.001$)

Results – Bone Graft Choice

- Use of recombinant bone morphogenic protein-2 did not affect pseudoarthrosis rate

	All patients	Open TLIF	misTLIF	P value
N=	308	104	204	
Pseudoarthrosis, overall	22/308 (7.1%)	6/104 (5.8%)	16/204 (7.8%)	0.5
Bone morphogenic protein (rBMP-2)	216/308 (70.1%)	73/104 (70.2%)	143/204 (70.1%)	0.98
Pseudoarthrosis, with rBMP-2	15/216 (6.9%)	4/73 (5.5%)	11/143 (7.6%)	0.55
Pseudoarthrosis, without rBMP-2	7/92 (7.6%) <i>p=0.84</i>	2/31 (6.5%) <i>p=0.85</i>	5/61 (8.1%) <i>p=0.9</i>	0.77

* Significant Surgeon Bias to Selection

Results

- ▣ Within the mis-TLIF cohort the only operative factor that showed a statistical significant association with pseudoarthrosis was undergoing a reoperation for **Same Segment Disease (SSD)** procedure rather than a primary (p=0.0001)
- ▣ There were no smokers in the mis-TLIF pseudoarthrosis group (All received BMP)

Limitations

- ▣ Retrospective
- ▣ Small sample size
- ▣ Single institution
- ▣ Surgeon selection bias for procedure & graft choice

Conclusions

- mis-TLIF vs. open TLIF demonstrated NO difference in rate of **pseudoarthrosis**
- **Revision surgery** resulted in higher rate of pseudoarthrosis than did primary surgery
- Preoperative MRI findings of **increased disc height, increased anterior:posterior disc height ratio, and increased disc angulation** were identified as risk factors for pseudoarthrosis in both cohorts
- Choice of interbody bone graft material (allograft, demineralized bone matrix, rhBMP-2) did not affect rate of pseudoarthrosis