

Postoperative loss of lumbar lordosis affects clinical outcomes in patients with pseudoarthrosis after PLIF using cortical bone trajectory screw fixation.

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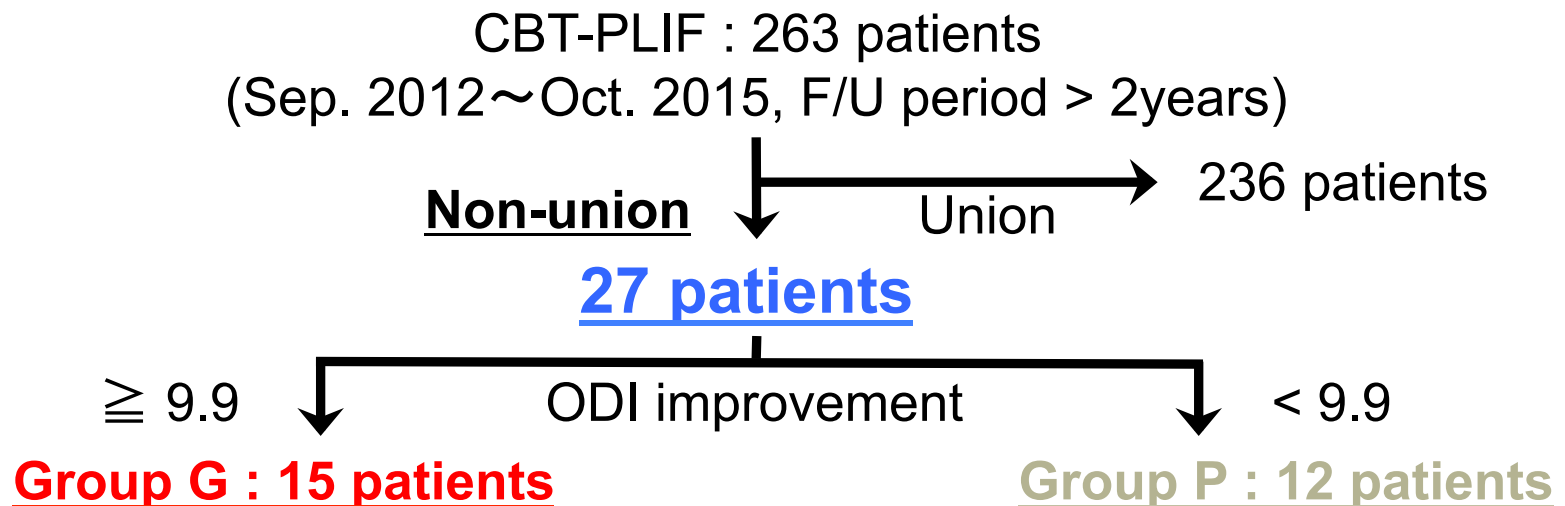
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Object

- Pseudoarthrosis after PLIF is one of the major complications. However, in some patients with pseudoarthrosis after PLIF, clinical symptoms improved satisfactorily after surgery.
- This retrospective study thus aimed to investigate relationships between clinical outcomes and radiographic parameters in patients who developed pseudoarthrosis after single-level PLIF with cortical bone trajectory screw fixation (CBT-PLIF).

Methods

- ✓ Among 263 patients who underwent single-level CBT-PLIF for degenerative lumbar disorders between Sep. 2012 and Oct. 2015 (minimum follow-up: 2 years), 27 patients diagnosed with pseudoarthrosis using both dynamic radiographs and computed tomography of the lumbar spine were enrolled in this study.
- ✓ They were divided into two groups based on improvement of the Oswestry Disability Index (ODI) at 2-year follow-up.
- ✓ Group G consisted of 15 patients with greater improvement of ODI than the mean improvement of ODI (9.9), and group P consisted of the others (12 patients).
- ✓ As radiographic parameters, lumbar lordosis (LL), segmental lordosis (SL), segmental range of motion (Seg-ROM), existence of screw loosening, and extent of subsidence were compared between the groups.



Results

Table 1. The mean ODI improved from 19.9 points before surgery to 9.6 points at 2-year follow-up visit in all 27 patients. (mean improvement: 9.9 points)

	<i>preoperative</i>	<i>postoperative</i>	<i>p value</i>
<i>ODI</i>	19.9 (5-33)	9.6 (0-28)	< 0.01

Wilcoxon signed rank test

Results

Table 2. Demographic characteristics of 27 patients with pseudoarthrosis. None of age at the time of surgery, sex, BMI, fused areas and preoperative ODI showed significant differences between the 2 groups.

		<i>group G</i> (n=15)	<i>group P</i> (n=12)	<i>p value</i>
<i>Sex (M : F)</i>		9 : 6	6 : 6	0.66
<i>mean age (yrs)</i>		72.9 (62-82)	73.6 (66-81)	0.79
<i>BMI (kg/m²)</i>		26.5 (20.8-36.0)	23.8 (18.6-28.3)	0.17
<i>Fusion segment</i>	<i>L3/4</i>	3	1	0.25
	<i>L4/5</i>	10	6	
	<i>L5/S1</i>	2	5	
<i>Preoperative ODI</i>		22.3 (11-33)	17.0 (5-31)	0.06
<i>Postoperative ODI</i>		7.8 (0-19)	11.7 (0-28)	0.31

Mann-Whitney's U test

Results

Table 3. None of the incidence of screw loosening and the extent of subsidence showed statistical differences between the 2 groups.

		<i>group G</i>	<i>group P</i>	<i>p value</i>
<i>screw loosening</i>	+	8	4	0.38* ¹
	-	7	8	
<i>subsidence (mm)</i>		0.97 (0.2-2.1)	1.01 (0.2-3.3)	0.63* ²

*¹Mann-Whitney's U test *²Student's *t* test

Results

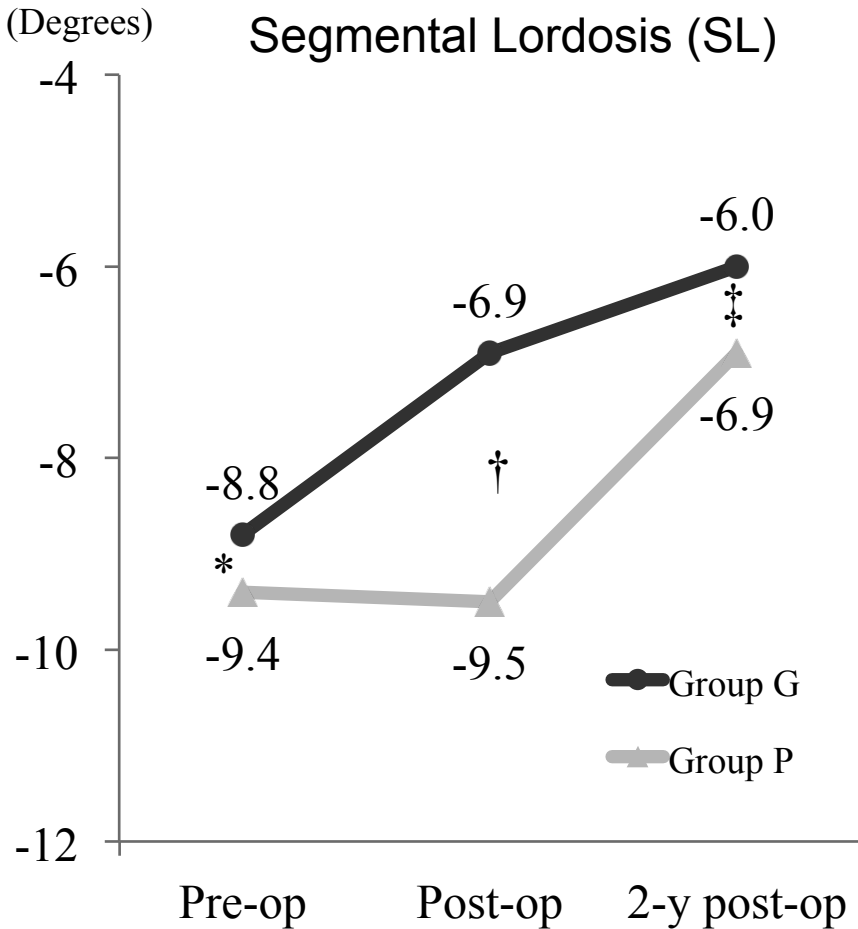


Figure 1. No significant differences are found in preoperative, immediate postoperative, and 2-year postoperative SL between the two groups ($p=^*0.77$, $^\dagger0.22$, $^\ddagger0.63$). (Student's t test)

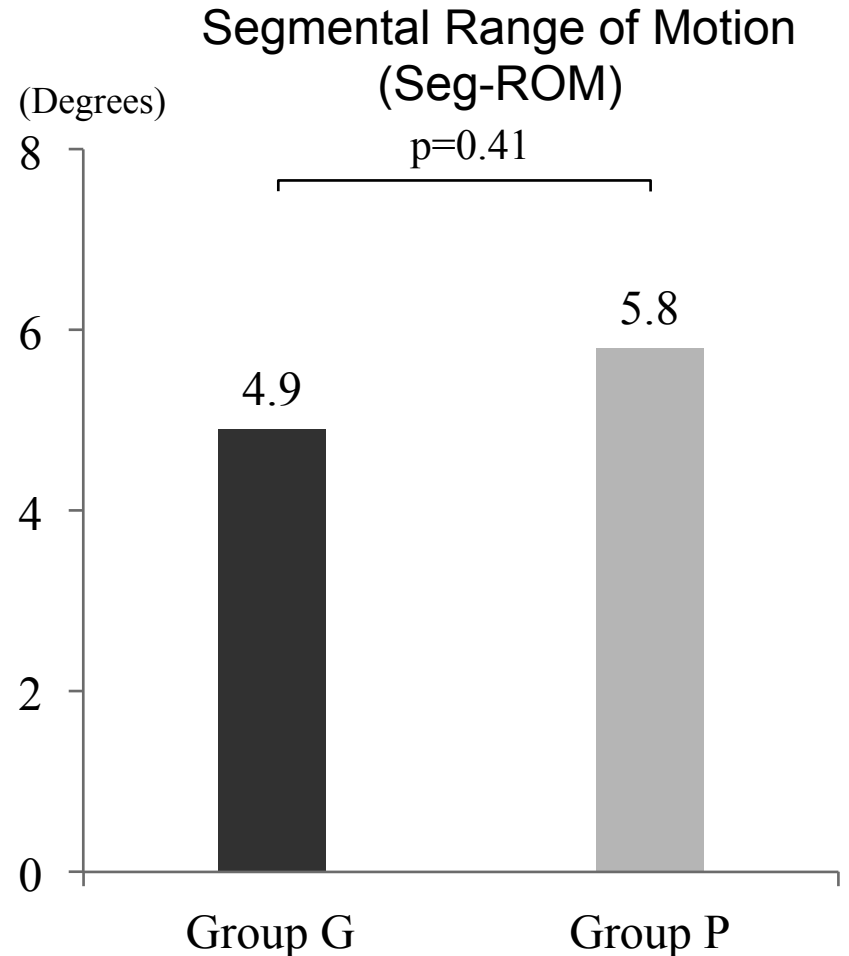


Figure 2. Seg-ROM at 2-year follow-up is not significantly different between the two groups. (Student's t test)

Results

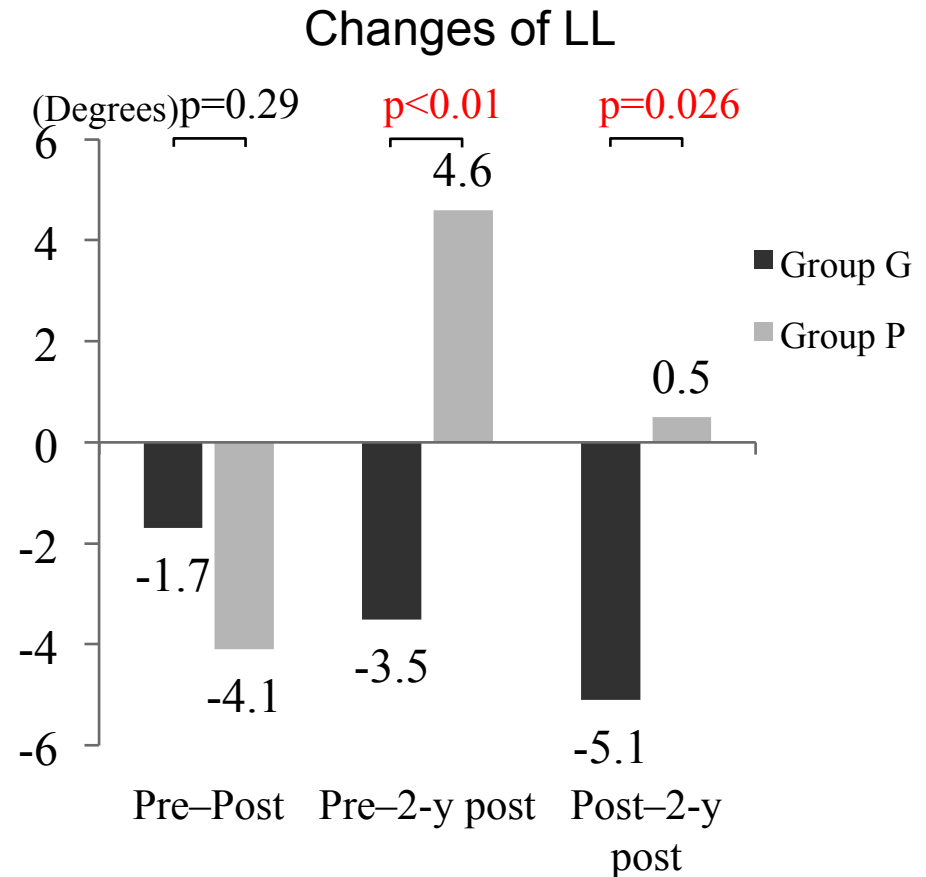
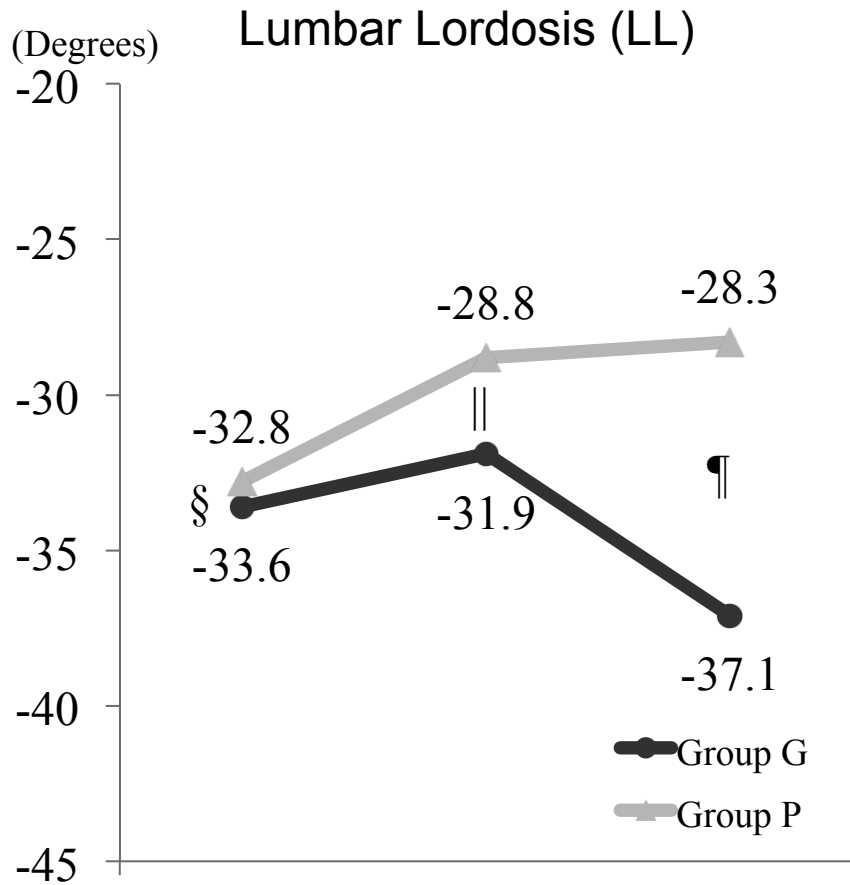


Figure 3. Two-year postoperative LL tends to be more lordotic in group G than in group P, although no significant difference is found between the two groups (p=[§]0.86, ^{||}0.43, [¶]0.099). (Student's t test)

Figure 4. The changes of LL from before surgery to postoperative 2-year follow-up and the changes during postoperative 2 years were significantly better in the group G than in the group P. (Student's t test)

Discussion

- Lordotic changes after lumbar surgery
 - Decompressive laminectomy increased the LL.※1
 - LL was improved after TLIF as a result of spontaneous restoration of lordosis at the unfused lumbar levels.※2

※1 Jeon CH. Spine (Phila Pa 1976) 2015

※2 Cheng X. World Neur Surg 2018

- Influences of postoperative decreased LL
 - Lower score of JOABPEQ (pain-related disorders, social life dysfunctions, psychological disorders)※3
 - Higher risk of Adjacent Segment Disease※4

※3 T.Makino. Spine (Phila Pa 1976) 2017

※4 T.Matsumoto. J NeurSurg Spine

⇒ In patients with pseudoarthrosis after single-level PLIF, when the lordotic angles spontaneously increased at unfused segment, better improvement of the clinical outcomes might be observed.

Conclusions

Of the 27 patients with pseudoarthrosis after single-level CBT-PLIF, the lumbar spine had been becoming more lordotic during postoperative 2 years in 15 patients with better improvement of ODI, whereas 12 patients with less improvement of ODI had been losing LL during postoperative 2 years.

These results indicate **that postoperative loss of lumbar lordosis affects clinical outcomes in patients with pseudoarthrosis after single-level CBT-PLIF.**

Disclosure of Conflict of Interest

Conflict of Interest (COI) of the Principal Presenter:
No potential COI to disclose