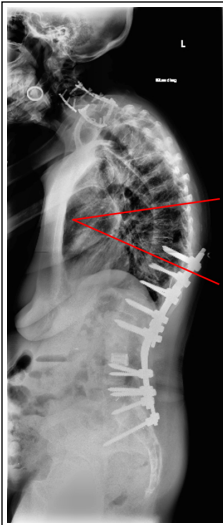


Prevalence and Risk Factors for Proximal Junctional Kyphosis (PJK) Following Realignment Surgery by Pedicle Subtraction Osteotomy: A Multicenter Review

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Introduction: This study analyzes the prevalence and risk factors for the development of PJK following lumbar PSO. The hypothesis was that PJK would develop early in the post-operative period, at high rates, and that risk factors based on baseline and follow-up radiographs would emerge.



Frequent “Complication”

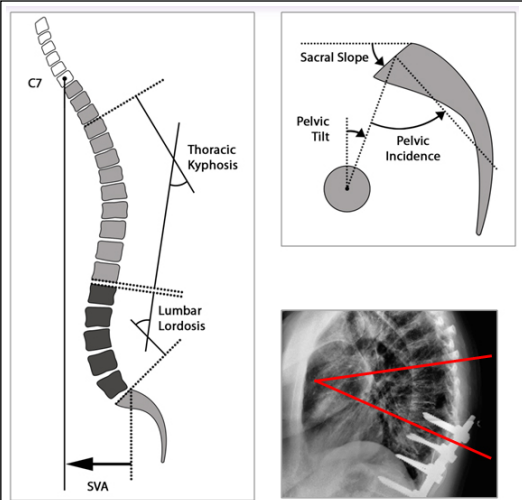
- Prevalence: 20% - 40%
- Often asymptomatic
- Can be catastrophic
- Risk factor
 - Age,
 - Under correction
 - UIV in kyphotic area

Study Objectives

- Evaluation of PJK prevalence in patients treated with osteotomy
- Risk factor analysis

Methods: This multi-center, consecutive retrospective analysis was based on patients undergoing PSO surgery for ASD. **The prevalence analysis** was identified on cases with 2-year follow-up standing X-rays and at least 1 follow-up at 6 months or 1 year. Inclusion criteria are Adult Spinal Deformity patients (ASD) with a lumbar osteotomy and a long or short fusion .

Risk factors of developing PJK were investigated on patients with 6-month follow-up and short fusion (T10-L2). Inclusion criteria: ASD, lumbar osteotomy and a short fusion.



PJK : Radiographic definition

Last instrumented vertebra+ 2 adjacent levels
Change > 10° + Alignment post-op > 10°

Results Prevalence Analysis: 56 patients (mean age 57yo, 44F) with lumbar PSO (50% at L3) were analyzed. 21 patients had a long fusion, 29 had a short fusion. The 2-year analysis revealed **high rate of PJK (39%)**, without significant difference between short and long fusions. Revision rate was 15%, with 4% occurring due to PJK.

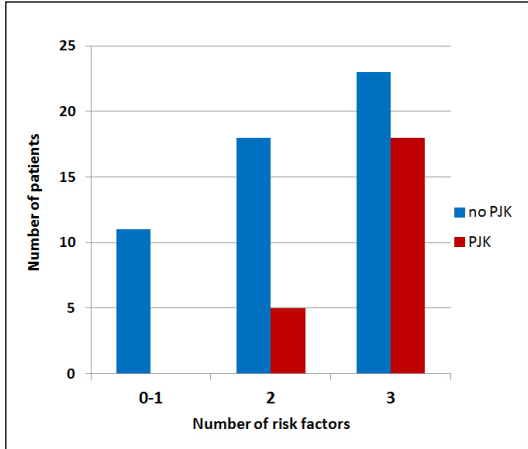
Results Risk Factor Analysis: 74 patients were included (mean age 59yo, 44F, mainly revision cases [84%]). Surgery consisted of a PSO between L1 and L5 (53% a L3), and a "Short" fusion (max T10). 31% of treated patients developed PJK 6months after the surgery. PJK patients were older (63 vs 57 years old, p=0.04), had greater osteotomy resection, and greater post-operative kyphosis and lordosis, without difference in Pelvic incidence (Table 1).

	Pre-Op		Post-op		t-test
	no	PJK	no	PJK	
PJK	0.4	-2	-6	-24	*
KyphosisT4 T12	-19	-25	-32	-50	*
Lordosis L1 S1	17	20	49	57	*
SVA (cm)	14	14	3.5	5.8	
T1 tilt	5	5	-3	-2	
Sacral Slope	27	26	35	33	
Pelvic tilt	30	32	22	24	
Pelvic Incidence	56	57	56	57	
PI-LL	40	38	7	0.4	*

Table 1: Xray comparison (PJK / no PJK)

No change in terms of prevalence was noticed between early post-op and 2 years. **In 82% of PJK cases, PJK status at 2 years was the same as observed in earlier follow up period.**

Results Risk Factor Analysis: Significant risk factors for PJK were identified: neutral/kyphotic alignment at UIV/UIV+2, age >55, lumbar lordosis ideal correction or overcorrection. For patients with at most one of these risk factors, 0% PJK was noted, while patients with 3 risk factors developed PJK in 42%.



Conclusions: New appearance of PJK after 6 months seems uncommon. The prevalence of PJK following PSO occurs at a high rate radiographically (39% at 2 years) but few require surgical revision (4%). Risk factors for PJK following short fusion that have emerged include UIV alignment, age and lumbar lordosis correction. Future studies will assess the impact of radiographic PJK on health-related quality of life.