

Background : Despite the evidence in appendicular skeletal surgery, the effect of infection on spinal fusion remains unclear, particularly after Adult Spinal Deformity (ASD) surgery. The purpose of this study was to determine the impact of surgical site infection (SSI) in ASD surgery fusion rates and its association with other risks factors of pseudarthrosis. **Methods :** We conducted an international multicenter retrospective study on a prospective cohort of patients operated for spinal deformity with more than two years of follow-up. Patient's preoperative characteristics, pre- and postoperative spinopelvic parameters, surgical variables, and post-operative complications were recorded. Surgical site infections were asserted in case of clinical signs associated with positive surgical samples. Each case was treated with surgical reintervention for debridement and irrigation. Presence of pseudarthrosis was defined by the association of clinical symptoms and radiological signs of non-fusion (either direct evidence on CT-scan or indirect radiographic clues such as screw loosening, rod breakage, screw pull out or loss of correction). Each iterative surgical intervention was collected. Univariate and multivariate analysis with logistic regression models were performed to evaluate the role of risk factors of pseudarthrosis **Results :** 956 surgical ASD patients were included in the study. 65 of these patients were treated for SSI (6.8%), 138 for pseudarthrosis (14.4%), and 28 patients for both events. On multivariate analysis, SSI was found to be a major independent risk factor of pseudarthrosis (OR = 4.4; 95% CI = 2.4,7.9) as well as other known risks factors: BMI (OR = 1.1; 95% CI = 1.0,1.1), smoking (OR = 1.6; 95% CI = 1.1,2.9), performance of Smith-Petersen osteotomy (OR = 1.6; 95% CI 1.0,2.6), number of vertebrae instrumented (OR = 1.1; 95% CI = 1.1,1.2) and the caudal level of fusion, with a distal exponential increment of the risk (OR max for S1 = 6, 95% CI = 1.9,18.6). **Conclusion** SSI significantly increases the risk of pseudarthrosis with an OR of 4.4.

Multivariate analysis : global pseudarthrosis

Variable	OR	IC min	IC max	p
Age	1.00	0.9	1.0	0.627
BMI	1.1	1.0	1.1	0,002
Tobacco use	1.6	1.1	2.9	0.024
Osteotomy type				
Three-column osteotomy	0.8	0.4	1.4	0,37
Smith-Petersen	1.6	1.0	2.6	0.037
Inferior level of fixation				
L4	0.9	0.3	3.1	0.83
L5	3.5	1.2	9.8	0.018
S1	6.0	1.9	18.6	0.002
Iliac	6.9	2.7	17.0	0.000
Number of vertebrae fused	1.1	1.1	1.2	0.032
Infection	4.4	2.4	7.9	0.00