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Appendix 1
Risk of bias assessment for included studies

Checklist Items	First Author												
	Borkhuu[5]	Croft[2]	Farley[38]	Garg[10]	Glotzbecker[44]	Görges[39]	Haller[40]	Imahiyerobo[43]	Katyal[41]	Mackenzie[1]	McLeod[3]	Porter[42]	Salsgiver[4]
Reporting													
1. Is the hypothesis/aim/objective of the study clearly described?	Y	Y	Y	Y	Y	Y	Y	Y	P	Y	P	Y	Y
2. Are the main outcomes to be measured clearly described in the Introduction or Methods section?	P	P	P	Y	Y	Y	Y	Y	N	Y	Y	P	Y
3. Are the characteristics of the patients included in the study clearly described?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4. Are the interventions of interest clearly described?	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	Y	P	Y
5. Are the distributions of principal confounders in each group of subjects to be compared clearly described?	Y	N	N	N	Y	Y	Y	Y	Y	P	N	N	Y
6. Are the main findings of the study clearly described?	Y	Y	P	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7. Does the study provide estimates of the random variability in the data for the main outcomes?	N	Y	N	N	Y	Y	Y	N	N	Y	Y	Y	Y
8. Have all important adverse events that may be a consequence of the intervention been reported?	Y	P	p	P	P	P	P	P	P	P	P	P	P
9. Have the characteristics of patients lost to follow-up been described?	N	N	N	N	NC	NC	NC	NC	NC	NC	NC	N	NC
10. Have actual probability values been reported (e.g.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y

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0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?													
External Validity													
11. Were the subjects asked to participate in the study representative of the entire population from which they were recruited?	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12. Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	Y	N	N	NC	Y	P	Y	Y	Y	Y	Y	Y	Y
13. Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive?	P	P	NC	Y	P	P	P	P	P	P	Y	P	P
Internal Validity—Bias													
14. Was an attempt made to blind study subjects to the intervention they have received?	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
15. Was an attempt made to blind those measuring the main outcomes of the intervention?	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
16. If any of the results of the study were based on “data dredging”, was this made clear?	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
17. In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls?	N	NC	NC	NC	Y	Y	N	Y	N	Y	Y	Y	Y

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18. Were the statistical tests used to assess the main outcomes appropriate?	N	Y	P	P	Y	Y	N	N	P	Y	Y	P	Y
19. Was compliance with the intervention/s reliable?	Y	Y	Y	Y	P	Y	Y	Y	Y	Y	P	Y	Y
20. Were the main outcome measures used accurate (valid and reliable)?	Y	Y	Y	Y	Y	Y	Y	Y	NC	Y	P	Y	Y
Internal Validity—Confounding (Selection Bias)													
21. Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?	P	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
22. Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?	Y	Y	NC	Y	N	Y	N	N	Y	Y	Y	Y	Y
23. Were study subjects randomized to intervention groups?	N	N	N	N	N	N	N	N	N	N	N	N	N
24. Was the randomized intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
25. Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	N	N	N	N	P	Y	P	P	N	N	N	N	N
26. Were losses of patients to follow-up taken into account?	N	N	N	N	N	N	N	N	N	N	N	N	N
Power													

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27. Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?	NC	Y	NC	Y	NC	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL													
Yes	11	12	7	11	14	15	12	12	9	14	11	11	15
No	7	6	7	6	3	2	5	5	6	3	5	5	3
Partial	3	3	4	3	3	3	3	3	4	3	4	5	2
Not clear	2	2	5	3	3	3	3	3	4	3	3	2	3
Not applicable	4	4	4	4	4	4	4	4	4	4	4	4	4
Quality rating*	P	A	P	P	A	A	A	A	P	A	P	P	A
JBJS Level of Evidence	**T-III**	**P-II**	**P-II**	**P-II**	**T-III**	**T-III**	**T-III**	**T-III**	**P-II**	**P-II**	**P-II**	**P-II**	**T-III**

Y=Yes, N=No, P=Partial, NC=Not clear, NA=Not applicable

JBJS=The Journal of Bone and Joint Surgery

T-III=Therapeutic Level III Study, P-II=Prognostic Level II Study

*Rating criteria: good (G): at least 80% of criteria met; average (A): 50% to 80% of criteria met; poor (P): ≤ 50% of criteria met

Appendix 2:

Meta-analysis of cerebral palsy (CP), American Society of Anesthesiologists score (ASA), gastrostomy tube, non-ambulatory status, prior spine surgery, surgical procedures, instrumentation to pelvis, surgical time or estimated blood loss as a risk factor on surgical site infection

Figure 5:

No evidence of an increased risk of surgical site infection (SSI) in CP group compared to non-CP group (RR, 1.37 [95% CI, 0.68 to 2.73]; p=0.378). M-H=mantel-Haenszel, and df=degree of freedom

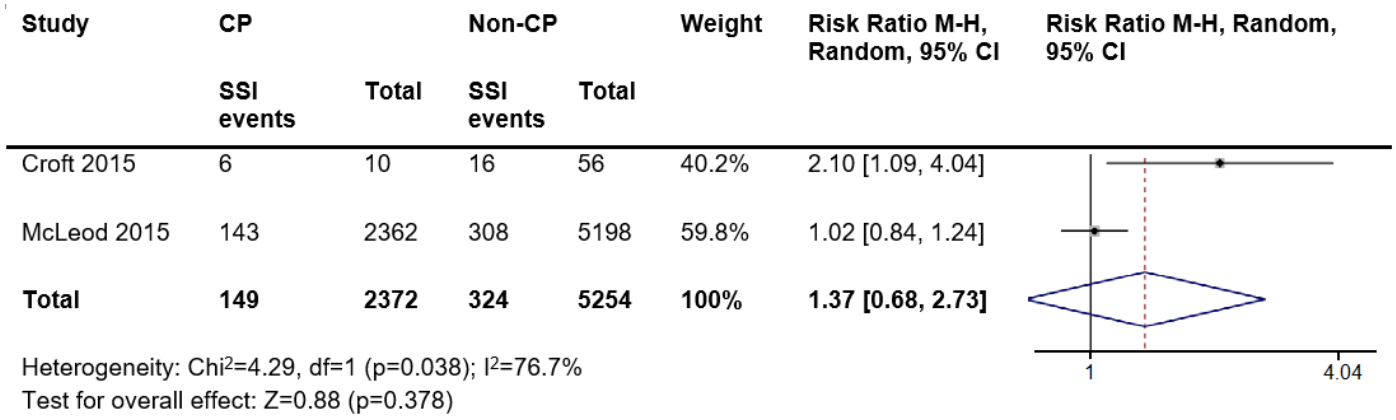

Figure 6:

No evidence of an increased risk of surgical site infection (SSI) in American Society of Anesthesiologists (ASA) score ≥3 group compared to ASA score <3 group (RR, 2.20 [95% CI, 0.53 to 9.10]; p=0.277). M-H=mantel-Haenszel, and df=degree of freedom

Figure 7:

Increased risk of surgical site infection (SSI) in gastrostomy tube (G-tube) group compared to non-G-tube group (RR, 1.69 [95% CI, 1.41 to 2.02]; p<0.001). M-H=mantel-Haenszel, and df=degree of freedom

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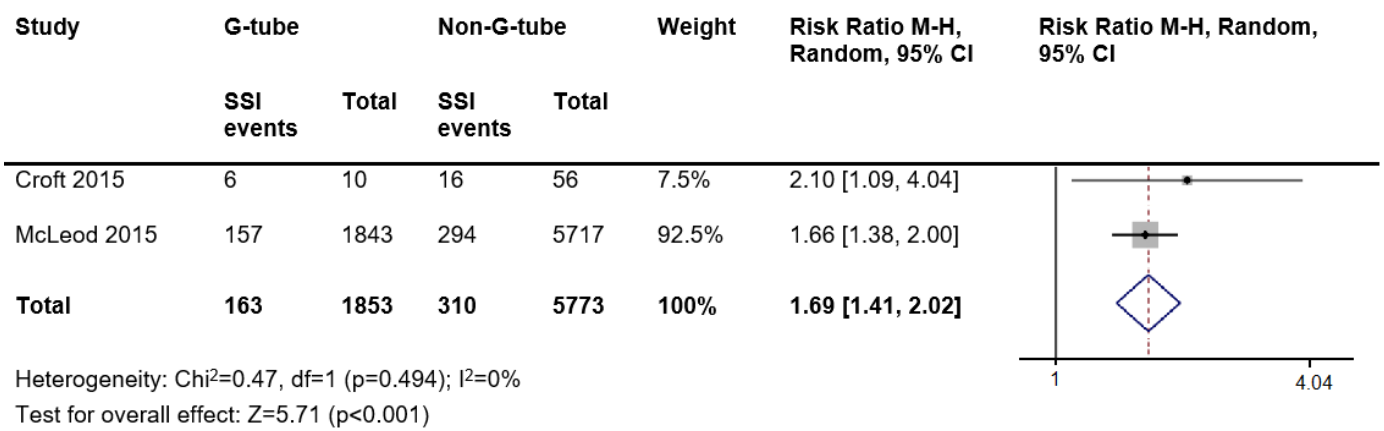

Figure 8:

Increased risk of surgical site infection (SSI) in Non-ambulator group compared to ambulator group (RR, 3.45 [95% CI, 2.08 to 5.72]; p=0.005). M-H=mantel-Haenszel, and df=degree of freedom

Study	Non-ambulator		Ambulator		Weight	Risk Ratio M-H, Random, 95% CI
	SSI events	Total	SSI events	Total		
Croft 2015	12	20	10	46	57.1%	2.76 [1.43, 5.31]
Farley 2013	13	20	7	50	42.9%	4.64 [2.17, 9.91]
Total	**25**	**40**	**17**	**96**	**100%**	**3.45 [2.08, 5.72]**

Heterogeneity: Chi^2=1.03, df=1 (p=0.309); I^2=3.4%

Test for overall effect: Z=4.81 (p=0.005)

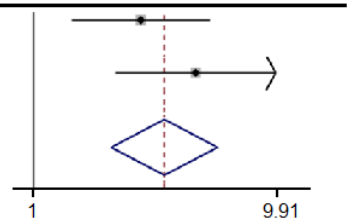

Figure 9:

No evidence of an increased risk of surgical site infection (SSI) in patients with prior spine surgery compared to patients without prior surgery (RR, 0.92 [95% CI, 0.29 to 2.97]; p=0.891). M-H=mantel-Haenszel, and df=degree of freedom

Study	Prior Spine Surgery		No Prior Spine Surgery		Weight	Risk Ratio M-H, Random, 95% CI
	SSI Events	Total	SSI Events	Total		
Croft 2015	5	10	17	56	51.44%	1.65 [0.79, 3.44]
Salsgiver 2017	11	369	10	167	48.56%	0.50 [0.22, 1.15]
Total	**16**	**379**	**27**	**223**	**100%**	**0.92 [0.29, 2.97]**

Heterogeneity: Chi^2=4.43, df=1 (p=0.035); I^2=77.4%

Test for overall effect: Z=0.14 (p=0.89)

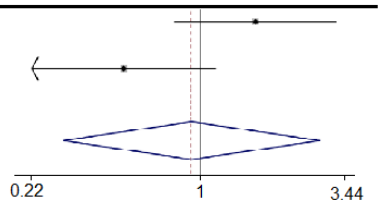

Figure 10:

No evidence of an increased risk of surgical site infection (SSI) in patients undergone arthrodesis compared to patients undergone growing construct (RR, 0.99 [95% CI, 0.66 to 1.47]; p=0.957). M-H=mantel-Haenszel, and df=degree of freedom

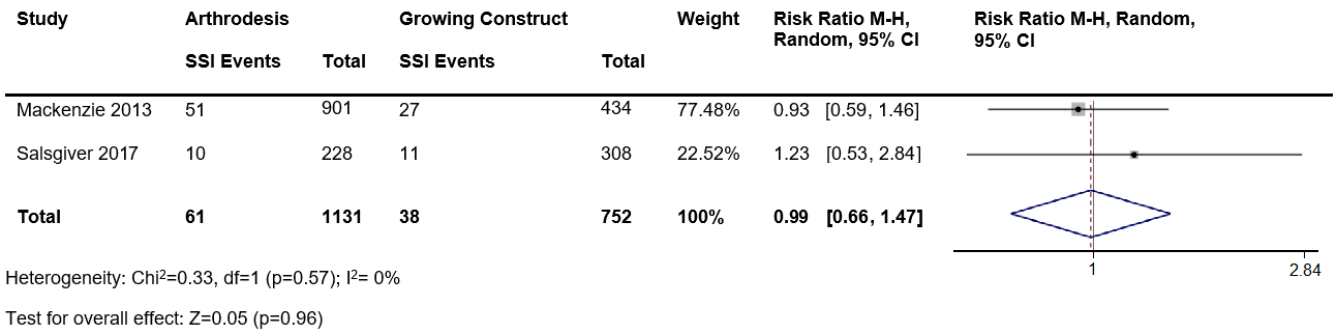

Figure 11:

Not evidence of an increased risk of surgical site infection (SSI) in patients undergone primary arthrodesis compared to patients undergone revision or converted arthrodesis (RR, 1.20 [95% CI, 0.62 to 2.31]; p=0.595). M-H=mantel-Haenszel, and df=degree of freedom

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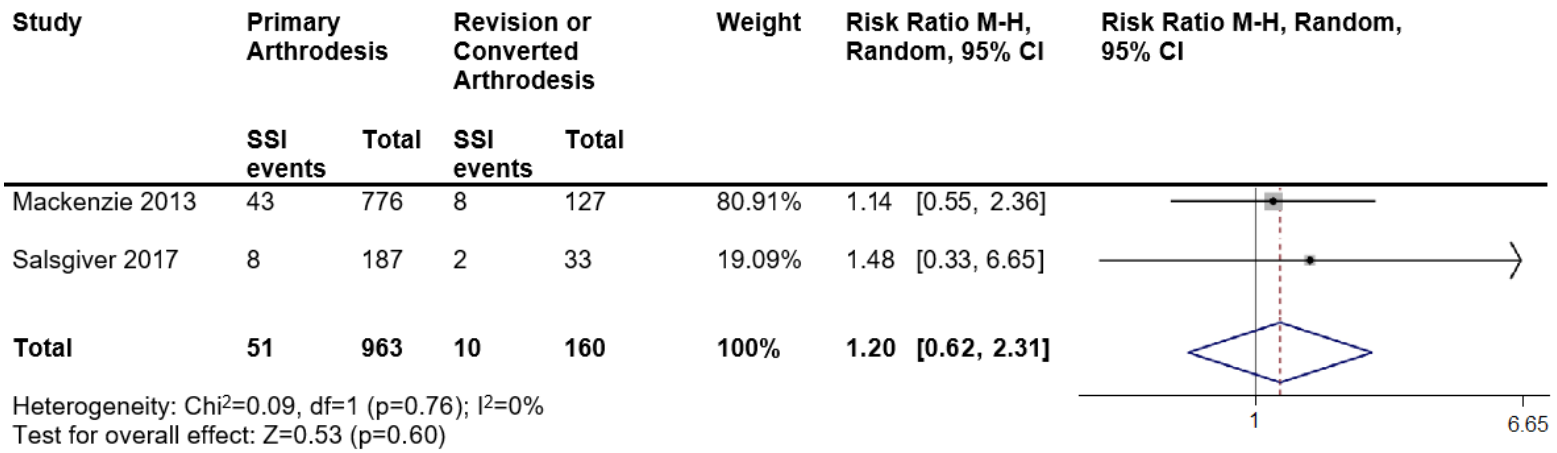


Figure 12:

No evidence of an increased risk of surgical site infection (SSI) in patients undergone growing construct insertion compared to patients undergone growing construct exchange/revision/removal (RR, 0.72 [95% CI, 0.33 to 1.56]; p=0.404). M-H=mantel-Haenszel, and df=degree of freedom

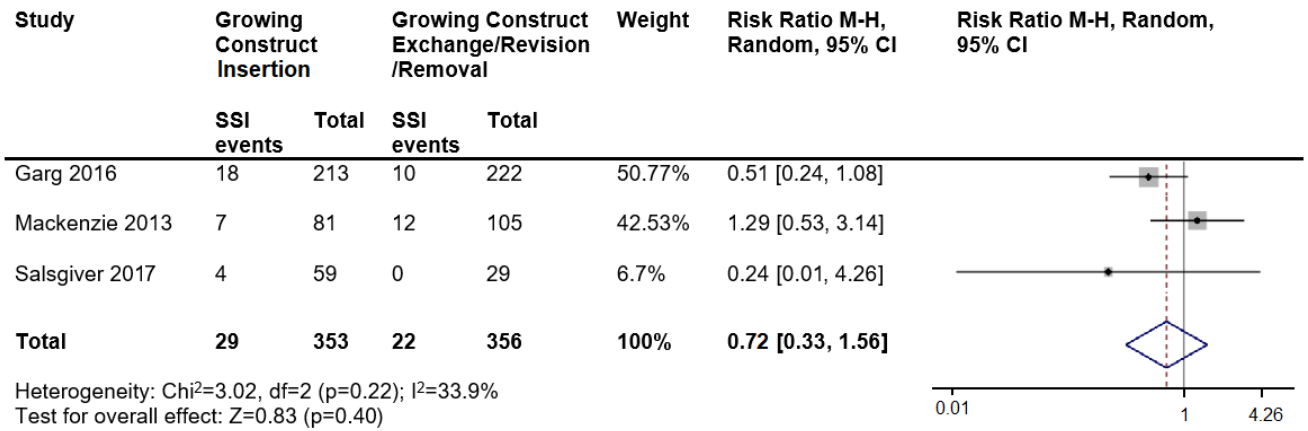


Figure 13:

Increased risk of surgical site infection (SSI) in pelvic instrumentation group compared to non-pelvic instrumentation group (RR, 3.38 [95% CI, 2.38 to 4.83]; p<0.001). M-H=mantel-Haenszel, and df=degree of freedom

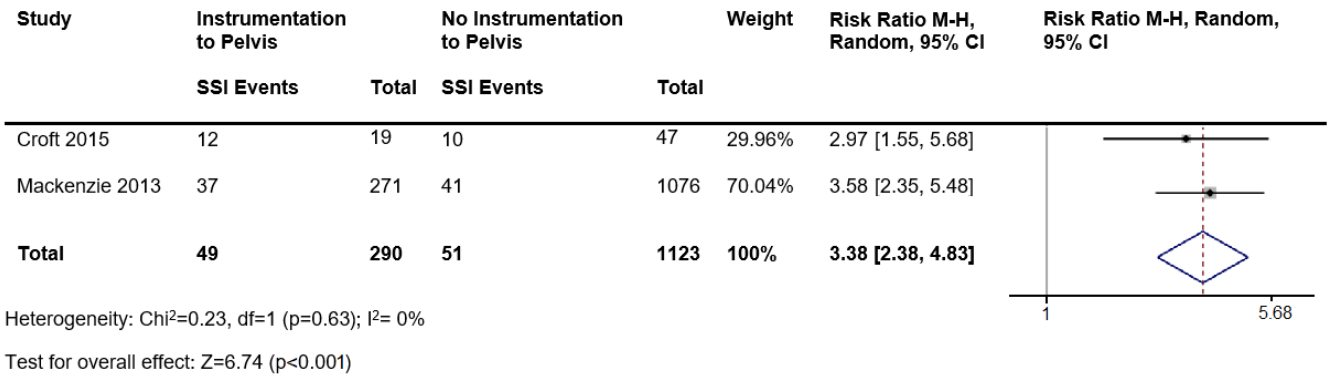
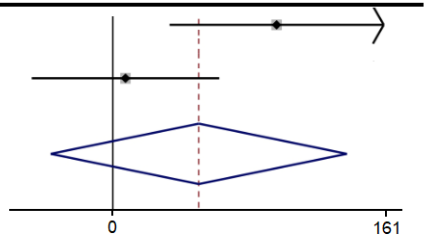


Figure 14:

No evidence of an association between surgical time and surgical site infection (SSI) (Mean Difference, 51.15 [95% CI, -36.97 to 139.27]; p=0.255). M-H=mantel-Haenszel, and df=degree of freedom

Study	Surgical Time (minutes)		Weight	Mean Difference, M-H, Random, 95% CI	Mean Difference, M-H, Random, 95% CI
	SSI Case (mean ± SD)	Non-SSI Control (mean ± SD)			
Croft 2015	359 ± 136	261.5 ± 97.7	48.48%	97.50 [33.76, 161.29]	
Farley 2014	254.5 ± 118.8	247 ± 0.2	51.52%	7.54 [-48.28, 63.36]	
Total			**100%**	**51.15 [-36.97, 139.27]**	

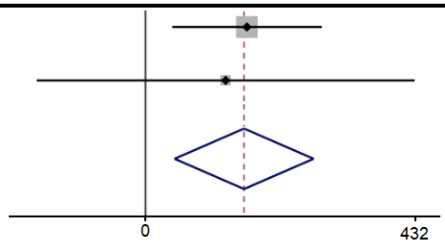


Heterogeneity: Chi^2=4.33, df=1 (p=0.037); I^2=76.9%
Test for overall effect: Z=1.14 (p=0.255)

Figure 15:

There are differences in estimated blood loss (EBL) between patients who had surgical site infection (SSI) and those who did not (Mean Difference, 158.38 [95% CI, 46.78 to 269.97]; p=0.005). M-H=mantel-Haenszel, and df=degree of freedom.

Study	Estimated Blood Loss (ml)		Weight	Mean Difference, M-H, Random, 95% CI	Mean Difference, M-H, Random, 95% CI
	SSI Case (mean ± SD)	Non-SSI Control (mean ± SD)			
Croft 2015	569.3 ± 249.8	406.3 ± 200.4	86.48%	163 [42.99, 283.01]	
Farley 2014	713.5 ± 636.7	584.7 ± 430.17	13.52%	128.80 [-174.66, 432.26]	
Total			**100%**	**158.38 [46.78, 269.97]**	



Heterogeneity: Chi^2=0.04, df=1 (p=0.837); I^2=0.0%
Test for overall effect: Z=2.78 (p=0.005)