

Local contamination is the cause of early deep wound infections following open posterior lumbosacral fusions

Brett Rocos MD FRCS (Tr & Orth), Bela Davidson, Lilly Rabinovitch, Christopher Nielsen MD FRCS(C), Fan Jiang MD FRCS(C), Alon Vaidman MD, Y. Raja Rampersaud MD FRCS(C), Stephen J. Lewis MD MSc FRCS(C)



Background

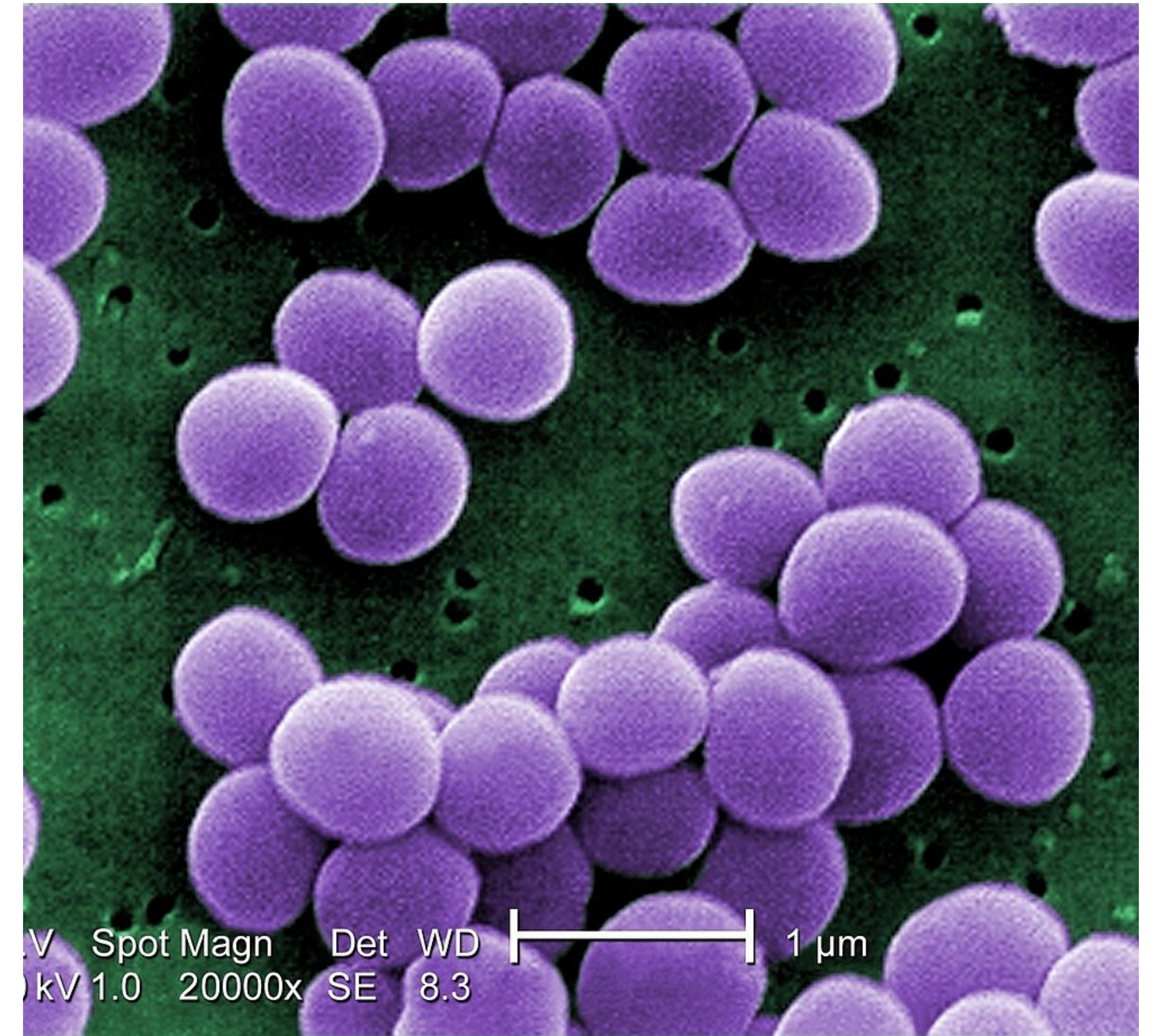
- Postoperative deep spinal wound infection (D-SWI) affects 4% of patients after fusion to the sacrum and pelvis
- It has usually been considered as being caused by intraoperative contamination
- However, techniques to reduce incidence have failed to significantly reduce the rate of infection
- External contamination is a neglected source of deep wound infection requiring debridement
- Understanding the incidence of infection due to external contamination will provide for new strategies for prevention



A surgical wound dressing applied after lumbosacral fusion contaminated with feces. Note the presence of a diaper preventing flow away from the wound and the heavily soiled bedclothes. This soiling is likely to cause early, deep surgical site infection.

Aim

- Define the pathogens responsible for D-SWI in open fusion to the sacrum/pelvis
- Describe the chronology of infections due to external and surgical contaminants
- Propose a strategy for reducing the rate



Methods

- Retrospective analysis of prospective database
- Inclusion: Aged > 18 years, open fusion to sacrum or pelvis, 1+ debridement(s) for deep wound infection.
- Exclusion: Index procedure for primary neoplasm, primary infection or confirmed dural leak
- Microbiological and surgical data collected from patient records
- Infections categorized into Outside-in if due to external contaminants, Inside-out if caused by surgical contaminants or No Growth if no positive microbiological culture.



Results

- 490 patients fused to sacrum/pelvis
- 21 with 1+ debridement(s) for deep infection
- No Growth: 4 patients
- Inside-out: 4 patients; *Staphylococcus sp.*
- Outside-in: 13 patients; *E.Coli*, *P.mirabilis*, *E. cloacae*, *B. thetaiotaomicron*, *Streptococcus sp.*, *S. macescens* and *P. aeruginosa*
- **No association** with BMI, EBL, surgical time, wound closure technique or dural injury

Group	No growth	Inside-out	Outside-In	P value
Age (years)	53.19	55.11	66.22	0.199
Female/Male	3/1	1/3	7/6	
BMI (range)	31.7 (30.0-34.2)	22.4 (17.4- 31.7)	35.7 (22.3- 62.4)	0.078
Number of cases	4	4	13	-
Time to debridement days, (95%CI)	63.5 (0- 164)	86.75 (8.3- 165.1)	20 (9.1-30.9)	0.009
Number of fused levels, median (IQR)	4 (3-7.5)	10 (3-15)	9 (5-15)	0.236
Dural tears (n)	1	3	3	0.188
EBL, mls, (range)	1100 (500-2000)	1900 (1400-2350)	1985 (250-4150)	0.356
Surgical time mins (range)	353 (240- 405)	455 (195- 705)	412 (200- 645)	0.628

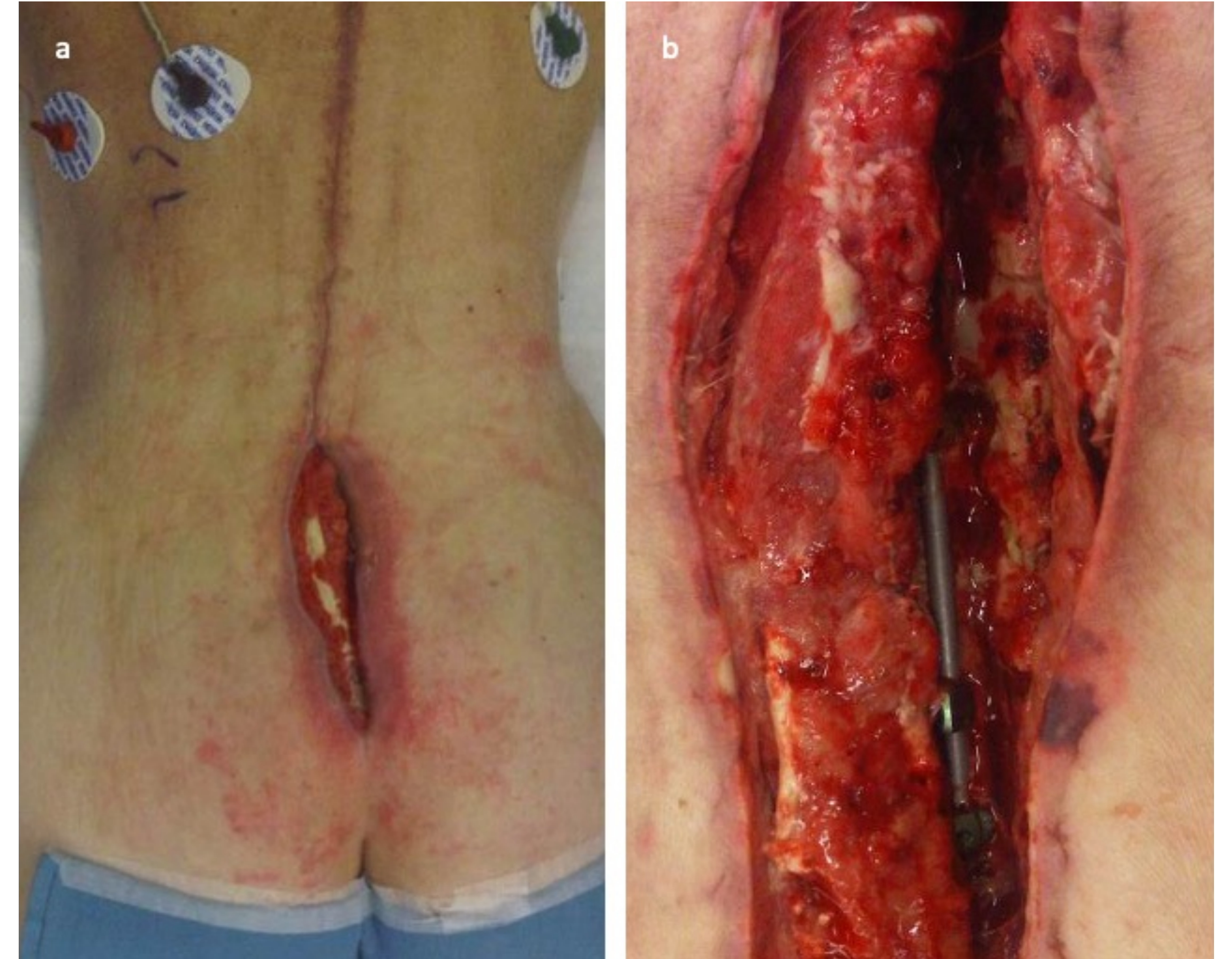
Time to debridement

- Inside-out: 86.75 (95%CI 8.3- 165.1 days)
- **Outside-in: 20.0 days (95%CI 9.1-30.9 days)**
- No Growth: 63.5 days (95%CI 0- 164 days)

Outside-in leads to debridement 20 days (95%CI 119- 14 days, p = 0.012) earlier than Inside-out infections

Discussion

- Outside-in infections are more common than and occur earlier than Inside-out infection
- These are caused by bowel and urogenital commensals
- Occlusive dressings will be important to prevent contamination and infection
- Meticulous management of bowel care early in recovery is essential
- Accepting the risk of UTI, prolonging bladder catheter use may be recommended.



Intraoperative images of the same wound a) after removal of the wound dressing and superficial cleaning prior to debridement. Note the erythema and excoriation surrounding the wound caused by fecal irritation. b) on superficial debridement showing the deficient thoracolumbar fascia and exposed instrumentation. Note the devitalised tissue and necrotic skin edges.

Bottom Line

67% of deep infections after fusion to the sacrum or pelvis are caused by external wound contamination, and these **occur much earlier** than those caused by surgical contamination.

Bowel and urinary tract management are essential to prevent infection.

Disclosures

None of the authors has any potential conflict of interest