



Negative Pressure Wound Therapy with Instillation and Dwell for Complex Spinal Wounds with Implants: A Scoping Review and Institutional Case

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Background

Postoperative spinal hardware infections present a difficult surgical challenge, requiring careful balance between salvage and infection control.

Negative Pressure Wound Therapy with Instillation (NPWTi) combines suction with antiseptic instillation to enhance wound healing. Its role in the management of complex spinal wounds with instrumentation remains understudied.

Research Objectives

- To map the current literature on the use of NPWTi in spinal instrumentation infections.
- To highlight gaps in existing evidence through a scoping review and a single-institution case example.

Methods

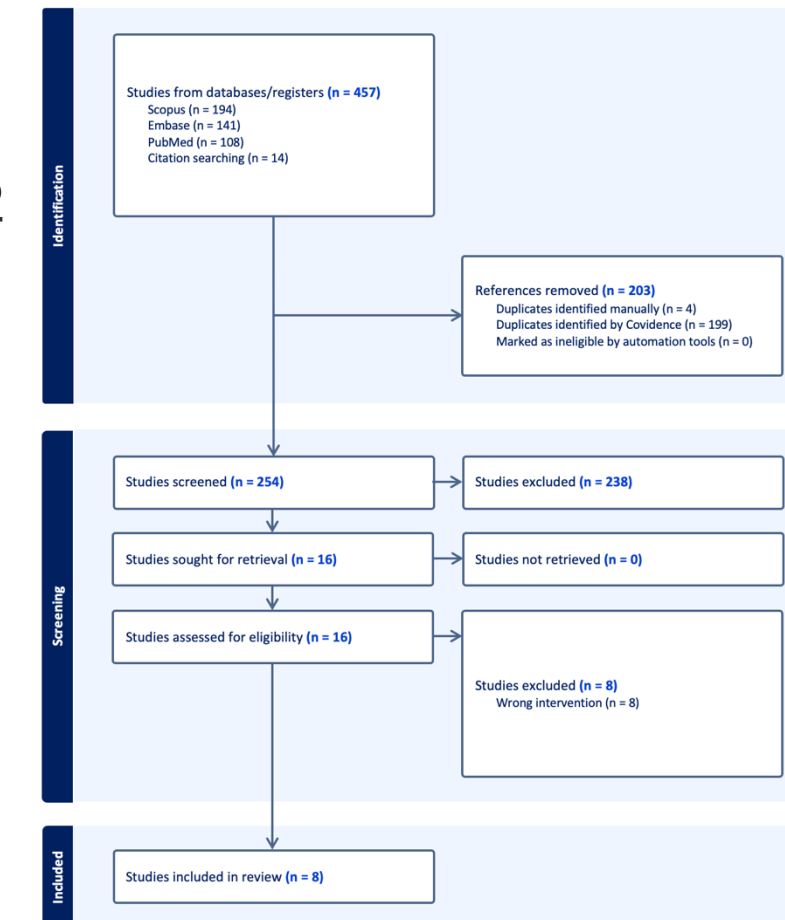
- Scoping review conducted per PRISMA-ScR guidelines.
- Databases searched: Scopus, Embase, PubMed, and citation chaining. Included studies reporting on NPWTi for spinal infections and instrumentation salvage.
- Screening and deduplication via Covidence.

Results

Of 254 studies screened, 8 met inclusion: 2 case reports, 2 case series, 1 animal study, and 3 reviews.

Across 15 of 16 spine cases, NPWTi was associated with biofilm disruption, reduced bioburden, enhanced granulation, and hardware salvage (94%).

Most protocols used Dakin's 0.125%, saline, or Prontosan as instillation fluids, 10-15 minutes dwell times, 3-4 hour cycles, and -125 mmHg pressure with ROCF-CC dressing.



Author, Year, Study Location, Design	Article Title
Katsumi et al. (2022, Japan). Case Report	Tension Pneumocephalus Associated with Negative Pressure Wound Therapy with Instillation and Dwell Time for Methicillin-resistant Staphylococcus aureus Infection After Spinal Deformity Surgery.
Hrasovec et al. (2020, Slovenia). Case Report.	Initial Experience Using Negative Pressure Wound Therapy With Instillation and Dwell Time for Postoperative Wound Treatment After Spinal Fusion Surgery: A Case Report.
Hehr et al. (2020, USA). Case Series	Instillation negative pressure wound therapy: An effective approach for hardware salvage.
West et al. (2018, USA). Case Series.	Instillation Negative Pressure Wound Therapy: An Effective Tool for Complex Spine Wounds.
Singh et al. (2017, USA). Animal Model	The Effect of Negative Pressure Wound Therapy With Antiseptic Instillation on Biofilm Formation in a Porcine Model of Infected Spinal Instrumentation.
Liu et al. (2021, USA). Narrative Review.	Management of Wounds With Orthopedic Fixation Hardware Using Negative-Pressure Wound Therapy With Instillation and Dwell
Saini et al. (2023, India). Narrative Review.	Evolving Role of Negative Pressure Wound Therapy with Instillation and Dwell Time in Management of Trauma and Orthopaedic Wounds: Mechanism, Applications and Future Perspectives
De Pellegrin et al. (2023, Switzerland). Systematic with meta-analysis.	Effects of negative pressure wound therapy with instillation and dwell time (NPWTi-d) versus NPWT or standard of care in orthopaedic surgery: A systematic review and meta-analysis

Case Example

57-year-old male with chronic spinal wound overlying exposed instrumentation (C7–S2) and underlying osteomyelitis. Managed with staged treatment: serial debridement, paraspinous muscle flap, NPWTi using V.A.C. VeroFlo system (3M+KCI), and delayed SGAP flap closure.



Figures: Initial wound with exposed hardware (top left). Intraoperative NPWTi placement (middle). Post-op day 4 shows early healing (top right). Post-op day 11 after SGAP flap shows closed incision (bottom). Discharged 3 weeks after initial surgery.



Conclusion

NPWTi facilitated successful closure and salvage of spinal hardware in an otherwise high-risk wound.