

META-ANALYSIS: COMBINING NPWT + TOT

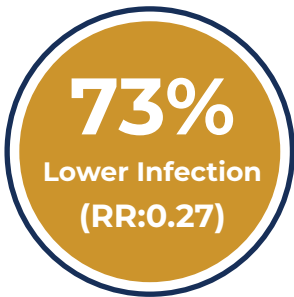
11 RCTS
844 PATIENTS

Su J, Zhang D, Du J, et al. The Efficacy of Negative Pressure Wound Therapy Combined with Topical Oxygen Therapy in Treating Chronic Refractory Wounds: A Systematic Review and Meta-Analysis. Adv Wound Care. Published online August 13, 2025.

STUDY OBJECTIVE

To evaluate the clinical efficacy of combining **Negative Pressure Wound Therapy (NPWT)** with **Topical Oxygen Therapy (TOT)** for treating chronic refractory wounds (CRWs).

Rationale: NPWT often induces local hypoxia. TOT supplements oxygen to restore metabolic function and optimize the wound microenvironment.



METHODOLOGY			
 <p>Design: 11 Randomized Controlled Trials (RCTs)</p>	 <p>Participants: 844 patients with chronic refractory wounds</p>	 <p>Protocol: PRISMA 2015 guidelines (PROSPERO: CRD42024618561)</p>	 <p>Data Sources: PubMed, Cochrane, Embase, Web of Science, CNKI (through Oct 2024)</p>

META-ANALYSIS RESULTS SUMMARY			
Comparison: NPWT+TOT vs. NPWT Alone			
Complete Wound Healing Rate	RR	1.51	1.36 – 1.69
Bacterial Positivity Rate	RR	0.27	0.18 – 0.41
Overall Healing Time	MD (days)	-9.09	-11.98 to -6.20
Time to Skin Grafting	MD (days)	-2.82	-3.15 to -2.50
Granulation Coverage	MD (%)	+7.56	6.09 to 9.03

RR = Risk Ratio; MD = Mean Difference

INCLUDED WOUND ETIOLOGIES			
Diabetic Foot Ulcers	Pressure Injuries	Venous Ulcers	Mixed Etiologies

KEY OUTCOMES & CONCLUSION

SUBGROUP ANALYSIS: HEALING RATES

<p>Pressure Injuries</p> <p>RR 1.89 ✓</p> <p>Highest Efficacy</p> 	<p>Mixed CRWs</p> <p>RR 1.38 ✓</p> <p>Significant Benefit</p> 	<p>Diabetic Foot</p> <p>RR 1.75 (Trend Only)</p> <p>Small Sample Size</p> 
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WHY NPWT + TOT WORKS

 <p>Reverses Hypoxia Counteracts oxygen deficiency from negative pressure suction.</p>	 <p>Promotes Angiogenesis Stimulates VEGF expression to build new capillaries.</p>
 <p>Bactericidal Effect Enhances neutrophil respiratory burst to clear infection.</p>	 <p>Accelerates Repair Supports mitochondrial energy for tissue regeneration.</p>

CLINICAL BENEFITS

 <p>Significant reduction in time to skin grafting (-2.82 days)</p>	 <p>Cleaner wound bed with significantly lower bacterial load</p>	 <p>Potential for reduced hospital stay and resource utilization</p>	 <p>Helps transition stuck wounds from inflammatory to proliferative phase</p>
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<p>CONCLUSION</p> <p>Adding Topical Oxygen Therapy to NPWT is a synergistic strategy that significantly improves healing rates and reduces infection risks in chronic refractory wounds, particularly pressure injuries.</p>	<p>RECOMMENDATION</p> <p>Consider adopting combined protocol for wounds that fail to progress with standard NPWT alone.</p>
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