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A Systematic Review on the Application of Nanofiber Wound Dressings in Promoting Burn Wound Healing

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ABSTRACT

Introduction: Burn injuries represent a significant healthcare challenge, necessitating effective wound healing strategies. Nanofiber wound dressings offer promising advantages over traditional methods due to their unique structural and functional properties. However, a comprehensive review of their application in promoting burn wound healing is currently lacking. This systematic review endeavors to critically assess the efficacy and safety of nanofiber wound dressings in burn care, aiming to provide valuable insights for future research endeavors and clinical practice.

Search Strategy: This systematic review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-P) guidelines and utilized the Population, Intervention, Comparison, Outcome (PICO) framework. A comprehensive search was conducted across reputable databases such as PubMed, Medline, Web of Science, and Scopus, encompassing 2020 to 2024. Search terms included “nanofiber,” “burns,” and “wound healing.” Two reviewers independently evaluated retrieved articles based on predetermined inclusion and exclusion criteria. Studies investigating the application of nanofiber wound dressings in burn wound healing were selected. Methodological quality was critically assessed using established tools. Ultimately, 17 articles were found, of which 13 studies met the predefined criteria for inclusion in this review.

Results: The systematic review of the 13 relevant articles investigating the application of nanofiber wound dressings in burn wound healing revealed promising outcomes. Nanofiber dressings exhibited accelerated wound closure, reduced inflammation, and enhanced tissue regeneration compared to traditional methods. They demonstrated excellent biocompatibility and minimal adverse effects, highlighting their safety and effectiveness in burn wound management. Various fabrication techniques and materials were identified, with electrospinning emerging as a standard method enabling precise control over fiber properties. Nanofiber dressings exhibited significant potential to enhance burn care practices and improve patient outcomes.

Conclusion and Discussion: The findings of this review underscore the promising role of nanofiber wound dressings in promoting burn wound healing. Their demonstrably accelerated healing, reduced inflammation, and enhanced safety profile position these dressings as a valuable addition to burn care.

Keywords: Burns, Systematic reviews, Wound Healing