



29 - DUAL ACTION OF THE NANOFAT MEMBRANE IN DIABETIC FOOT ULCERS: ENHANCING VASCULARIZATION AND COMBATING INFECTIONS

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Resumen

Introduction: Diabetic foot ulcers pose a significant clinical challenge due to delayed healing, high infection rates, and the risk of amputation. Conventional treatments often fail to stimulate adequate tissue regeneration. This study investigates the regenerative potential of a nanofat membrane enriched with adipose-derived stem cells and platelet-rich fibrin (PRF) for the treatment of diabetic foot wounds.

Methods: The Fakh-Manay Fat Membrane device was used to process adipose tissue, generating nanofat, which was combined with autologous PRF to form a bioactive membrane. Immunohistochemical analysis was performed to evaluate endothelial and stem cell markers, while antimicrobial properties were tested against clinically relevant bacterial strains.

Results: Between 2019 and 2024, 172 patients, including those with diabetic foot ulcers, were treated with nanofat membranes. The treatment significantly improved wound healing, as confirmed by increased neovascularization (CD31: 36.82%, CD34: 22.73%, ERG: 19.09%). The membrane also exhibited antimicrobial activity against various bacteria associated with chronic wound infections, including *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, and *Enterococcus faecalis*. Follow-up (1-16 months) showed high patient satisfaction, no reported complications, and improved wound closure rates.

Conclusions: The nanofat membrane offers an innovative dual-action approach for treating diabetic foot ulcers by promoting vascularization and combating infections. Its regenerative potential and antimicrobial properties highlight its clinical relevance in managing chronic wounds.