Effect of Biomimetic Peptides* on **Reepithelialization in Superficial Second**degree Face Burn: A **Case Report**

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Introduction

Second-degree burns affect both the epidermis and the dermis, causing significant tissue damage. This requires specific interventions to prevent infections and accelerate re-epithelialization. The scar formation phases hemostasis, inflammation, proliferation, and remodeling—are negatively influenced by infections, leading to pathological wound healing.

Biomimetic peptides are amino acid chains that mimic natural proteins involved in wound healing. These molecules promote cell proliferation, stimulate collagen synthesis, and modulate inflammation. Epidermal growth factors (EGF) and fibroblast growth factors (FGF) are peptides commonly cited in the literature that have demonstrated efficacy in angiogenesis and tissue regeneration, including the re-epithelialization of superficial and deep wounds.

The advantages of biomimetic peptides, such as their low toxicity and high biocompatibility, make them ideal for clinical applications. Their ability to mimic natural biological processes allows them to optimize the wound environment to improve healing outcomes. In deeper burns, nanoparticles coated with platelet membranes and FGF have been shown to be effective in increasing vascularization and accelerating wound healing, as well as promoting the regeneration of skin structures such as hair follicles. Additionally, biomimetic hydrogels, designed to replicate the properties of the extracellular matrix, provide a three-dimensional environment that facilitates cell adhesion and tissue regeneration.

Methods

A 25-year-old female patient presents with second-degree facial burns secondary to a firework explosion. Initially, decontamination protocol was followed by cleaning pyrotechnic material residues using 0.9% sodium chloride solution. This procedure was performed manually with sterile wound care materials.

Subsequently, the treatment protocol was initiated using Biomimetic Peptides*, included CG-EGF, CG-IGF1, CG-bFGF, CG-TRX, and Copper Tripeptide-1. The vial, equipped with a rubber-sealed puncture cap, was extracted using a sterile syringe. Topical application on the face was performed using sterile gloves, distributing 1.5 ml of the product on the first day, followed by 1 ml daily for the remaining days.

Daily evaluations were conducted using the Vancouver Scar Scale (VSS) to assess wound healing progression.

During the six-day treatment period, the use of additional products, such as petrolatum, which is commonly applied in similar clinical scenarios, was not permitted. To relieve burning sensations and discomfort caused by excessive dryness, local hydration was allowed using injectable water or 0.9% sodium chloride solution, applied with sterile gauze while avoiding friction on the skin.





Day 3



Treatment with biomimetic peptides achieved Treatment with biomimetic peptides proved to be significantly more efficient than conventional therapies in which results are typically expected over a longer period. The pigmentation observed on the sixth day represents a remarkable advancement, suggesting that biomimetic peptides not only support structural regeneration but also enhance the functional and aesthetic recovery of the skin. The increase in elasticity and flexibility of the regenerated tissue highlights the ability of biomimetic peptides to promote higherquality healing. The results of this case suggest that biomimetic peptides could play a positive role in skin re-epithelialization by reducing recovery time, and therefore, enhancing skin regeneration.

80% epithelial coverage by day 3, a significantly faster timeframe compared to the average of 8–15 days observed with standard therapies. Furthermore, by the sixth day, the onset of pigment recovery was noted, a process that typically occurs between 2 to 4 weeks after reepithelialization. Clinically, a significant reduction in erythema was documented from the third day of application, accompanied by a notable improvement in tissue elasticity, resulting in greater skin flexibility. From the third day onward, as scabs began to fall off, skin flexibility showed accelerated recovery compared to conventional treatments.



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Day 6

Discussion

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