

NILE TILAPIA SKIN (OREOCHROMIS NILOTICUS) AS A BIOLOGICAL DRESSING IN THE TREATMENT OF BURNS: A CASE REPORT

PELE DA TILÁPIA DO NILO (*OREOCHROMIS NILOTICUS*) COMO CURATIVO BIOLÓGICO NO TRATAMENTO DE QUEIMADURAS: RELATO DE CASO

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ABSTRACT

Introduction: Burns are most often caused by thermal, chemical, electrical or radioactive agents, which are difficult to handle. In this context, the use of Nile Tilapia (*Oreochromis niloticus*) skin for medical treatment of superficial and deep second-degree burns has been shown to be a new option. **Case report:** SMFFC, female, 22 year-old presented with superficial and deep second degree burns on the dorsum of the left foot, with 56 cm² (cm²) of extension. The patient received tilapia skin dressing. She was discharged and returning to normal activities in seven days, with full recovery of the full range of motor activity of the affected area. There were no complications at follow-up. **Comments:** The tilapia skin adheres to the dermis of the human skin, occluding the nerve endings, promoting an instant improvement of the pain. The skin dermis of the fish is composed of organized bundles of dense collagen fibers, allowing tensile strength, good moisture and reduced healing time. This is one of the few cases reported in the literature on the use of tilapia skin as a biological dressing for the treatment of human burns. This alternative may, in addition to reducing pain and healing time of wounds, reduce costs and mitigate possible complications, especially infections.

Keywords: Tilapia. *Oreochromis niloticus*. Therapeutics. dressing. Burns

RESUMO

Introdução: As queimaduras são, geralmente, causadas por agentes térmicos, químicos, elétricos ou radioativos de difícil manuseio. Nesse contexto, o uso da pele da Tilápia do Nilo (*Oreochromis niloticus*) para tratamento médico das queimaduras de 2º grau superficiais e profundas tem demonstrado ser uma nova opção. **Relato de caso:** SMFFC, gênero feminino, 22 anos, apresentou queimaduras por atrito de 2º grau superficial e profunda, no dorso do pé esquerdo, com 56 cm² de extensão. A paciente recebeu curativo de pele de tilápia, tendo recebido alta e retornado às suas atividades normais em sete dias, com recuperação total da amplitude de movimentos da área afetada e sem complicações no seguimento. **Comentários:** A pele da tilápia adere à derme da pele humana, ocluindo as terminações nervosas e promovendo melhora instantânea da dor. A derme da pele do peixe é composta por feixes organizados de fibras de colágeno denso, o que possibilita a resistência à tração, boa umidade e diminuição do tempo de cicatrização. Esse é um dos poucos casos relatados na literatura sobre a utilização da pele da tilápia como curativo biológico para tratamento das queimaduras. Essa alternativa poderá reduzir a dor, o tempo de cura das feridas e os gastos com tratamento e ainda mitigar possíveis complicações, sobretudo as infecções.

Palavras-chave: Tilápia; *Oreochromis niloticus*; Procedimento curativo; Queimaduras

INTRODUCTION

Burns are traumatic injuries that affect the individual systemically and are difficult to handle, typically caused by thermal, chemical, electrical, or radioactive agents¹. Most complex cases present significant challenges for clinical handling^{2,3}. In Brazil, burn patients are usually sent to public hospitals, where access to specialized care is limited⁴. Treat-

ment involves painful procedures, such as dressing changes and surgical debridement^{4,5}. In this context, the use of tilapia skin as a biological dressing for superficial and deep second-degree burns has emerged as a novel treatment. This intervention reduces the frequency of dressing changes, as the skin remains on the wound until complete healing, while also improving cost-effectiveness⁶. Current technologies al-

low for the preservation of certain biological dressings (e.g., amnion, hydrogel, pig skin, homograft skin, or ionizing radiation)^{7,8}. Tilapia skin is already being employed in other medical specialties, including urology and gynecology⁶.

CASE REPORT

A burn case resulting from a leisure-related activity affecting the extremities was presented to a private Burn and Wound Clinic for evaluation, two days after the incident. The patient, a 22-year-old female,

exhibited second-degree superficial and deep friction burns on the dorsum of the left foot, covering an area of 56 cm². She was selected for treatment with tilapia skin, based on the inclusion criteria: presentation to the specialized service within 72 hours post-trauma and presence of superficial and deep second-degree burns. The treatment began with the application of tilapia skin to the dorsum of the left foot (Figure 1). All procedures were conducted at the private Burn and Wound Clinic, where the patient received outpatient care three times a week to monitor treatment progress.



Figure 1. Initial application of tilapia skin to superficial and deep second-degree friction burns on the dorsum of the left foot.

Within 24 hours after the application of the biological dressing, the patient avoided extension and flexion movements of the injured foot to facilitate the adherence of the fish skin to the human dermis. She was discharged and resumed normal activities in seven days, with full recovery of the range of motion in the affected area and no complications during follow-up.

COMENTS

Complications associated with burn injuries,

such as scar contractures, unaesthetic scarring, and pain, are frequently reported concerns by patients. Concerning healing time, tilapia skin exhibits microscopic characteristics similar to the morphological structures of human skin, providing high tensile strength⁵. Moreover, the dermis of fish skin is composed of densely organized collagen fiber bundles (predominantly type I), in quantities about twice as high as those found in human skin. Through chemotaxis, the tilapia skin reduces the healing time, as observed in the treatment progression⁵ (Figure 2).



Figure 2. Treatment progression with tilapia skin.

Regarding pain, tilapia skin adheres to the human dermis, occluding nerve endings and providing immediate pain relief. The patient was assessed using the visual analog scale, ranging from zero to ten points. Pain intensity was evaluated at two distinct time points: during wound cleansing prior to dressing application (rated as nine) and sixty seconds after the application (rated as zero). Additionally, peptides present in the fish skin structure, presumably with antimicrobial and anti-inflammatory properties, may account for the favorable outcomes observed (i.e., healing time and pain relief)^{5,6}. This study is one of the few case reports on the use of tilapia skin as a biological dressing for burn treatment. This alternative may reduce pain and healing time, as well as also lower treatment costs and mitigate potential complications, particularly those related to infection.

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