

Use of Nile Tilapia (*Oreochromis niloticus*) skin in the management of skin burns

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An increase in burn cases has been reported with an ever increasing pace of life, leading to a negative socio-economic impact.¹ Literature shows that 0.5 million people with acute burn injuries are managed in the emergency department and 0.08 million patients are hospitalized every year in the United States.² In the management of burn patients numerous topical drugs including 'Mafenide acetate Sol.' and 'Silver Sulfadiazine' are used but are expensive and are associated with numerous drawbacks including severe side effects, poor results in deep burn wounds and formation of prominent scars.³ On the other hand collagen which comes from sources such as cattle and pig skin or chicken waste is also used for medicinal and pharmaceutical purposes.^{3,4} However these sources of collagen are inappropriate for use by some cultural and religious groups, and may be contaminated leading to diseases such as mad cow disease, foot and mouth disease and transmissible spongiform encephalopathy.³ Nile Tilapia (scientific name *Oreochromis niloticus*) is a fresh water fish and is commonly found and cultivated in Thailand and Brazil.^{3,4} The skin of this fish is not consumed and is discarded. Tilapia skin is rich in type I and III collagen fibers and has moisture and disease resistance similar to human skin. Researchers in Brazil have developed a sterilized tilapia skin wound dressing for second and third degree burns, on which clinical trials are being carried out and at least 56 patients have received this treatment up till now.⁵ In addition to being 75% cheaper than its alternative, Tilapia skin wound dressing can stay as long as 10 days and peeled off easily afterwards, as compared to gauze and silver sulfadiazine dressing which has to be changed

every day.⁵ Recently, tilapia collagen nano-fibers are found to result in skin wound healing speedily and successfully in rats by promoting cell adhesion, proliferation and differentiation.⁶ Yet another study published in 2017 carried out in vitro and in vivo experiments for wound healing evaluation, found promising application of marine collagen peptides from tilapia skin.⁴ According to the Brazilian researchers the treatment is cheap, speeds up healing and decreases the need for pain medication,⁵ and perhaps this cheap yet effective alternate treatment can also be employed in Pakistan.

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References

1. Edelman LS. Social and economic factors associated with the risk of burn injury. *Burns* 2007; 33: 958-65.
2. Wasiak J, Spinks A, Ashby K, Clapperton A, Cleland H, Gabbe B. The epidemiology of burn injuries in an Australian setting, 2000-2006. *Burns* 2009; 35: 1124-32.
3. Potaros T, Raksakulthai N, Runglerdkreangkrai J, Worawattanamateekul W. Characteristics of collagen from Nile tilapia (*Oreochromis niloticus*) skin isolated by two different methods. *Nat Sci* 2009; 43: 584-93.
4. Hu Z, Yang P, Zhou C, Li S, Hong P. Marine Collagen Peptides from the Skin of Nile Tilapia (*Oreochromis niloticus*): Characterization and Wound Healing Evaluation. *Mar Drugs* 2017; 15: 102.
5. Whitaker P, Garcia P. Brazilian doctors use fish skin to treat burn victims. [online] 2017 [Cited 2017 May 28]. Available from: URL: <http://www.reuters.com/article/us-health-brazil-burns-idUSKBN18L1WH>.
6. Zhou T, Wang N, Xue Y, Ding T, Liu X, Mo X, et al. Electrospun tilapia collagen nanofibers accelerating wound healing via inducing keratinocytes proliferation and differentiation. *Colloids Surf B Biointerfaces* 2016; 143: 415-22.

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