

# Post-Traumatic Ulcerations of Geriatric Patients and the Use of Fragmented and Intact Fish Skin\*

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## INTRODUCTION

It is well documented that geriatric patients are susceptible to injury and unable to contend with frictional and compressive forces associated with traumatic injuries (Bonifant & Holloway, 2019). Ulcerations from traumatic injury in geriatric patients can make definitive closure challenging due to age-related morphological skin changes and other morbidities. Advanced technologies, including skin substitutes, are often utilized to aid in the definitive closure of acute and chronic wounds. A novel skin substitute, fish skin, has emerged and has effectively healed acute wounds faster with improved functional outcomes (Baldursson et al., 2015 & Wallner et al., 2022)

## METHODS

Two case studies, (A) dog bite and (B) blunt trauma that initially presented as hematomas, led to post-traumatic ulcerations. The skin in the two geriatric patients was fragile and failed to respond to conservative management. The hematoma in the first case developed into a full-thickness ulcer with abscess and cellulitis, and the second resulted in a thick eschar with ulceration and abscess. Each patient required surgical intervention and the application of micronized and intact fish skin grafting (FSG) to facilitate healing.

The first patient (A) is a 92-year-old female who was scratched by a dog on August 31, 2021, resulting in a rupture hematoma, an abscess, and full thickness ulcer. The wound required an incision and drainage with debridement of the ulcer on September 28, 2021. The patient was treated intraoperatively with fragmented FSG and covered with intact FSG.

The second patient (B) is a 75-year-old female who incurred a hematoma from blunt trauma upon hitting her leg against a vase on November 29, 2021. The hematoma subsequently developed into a full-thickness eschar with an underlying abscess that required surgical incision and drainage with debridement of the eschar and application of fragmented and intact FSG on January 28, 2022.

Each patient required additional wound care management as an outpatient, including oral antibiotic therapy, repeat debridements, and compression therapy.

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## CASE 1 92-YEAR-OLD FEMALE TRAUMATIC WOUND

**Patient History:** 92-year-old female with past medical history of a broken acetabulum bone and COVID-19

**Wound History:** Patient presented with a full thickness wound with hematoma and severe infection with purulent exudate, which developed from an infected dog scratch.

**Fish Skin Graft Applications:** Single application of fragmented and intact fish skin graft

**Patient Outcomes:** Complete wound healing at 14 weeks



Initial application of intact FSG



Fragmented fish skin graft was applied to debrided wound bed, covered with intact fish skin graft and sutured in place



4 weeks post op



6 weeks post op



7 weeks post op



10 weeks post op



14 weeks post op

## CASE 2 75-YEAR-OLD FEMALE BLUNT TRAUMA WOUND

**Patient History:** 75-year-old female with past medical history of DMII and chronic kidney disease

**Wound History:** Patient presented with a hematoma which later developed into a full thickness eschar on after hitting her right leg against a vase.

**Fish Skin Graft Applications:** A total of two fish skin graft applications

**Patient Outcomes:** Good healing progression with complete wound completely healed at 5 months



Initial presentation 4 weeks post injury

Application of fragmented fish skin graft



3 weeks post op



4 weeks post op



6 weeks post op



9 weeks post op



Final healing outcome

## RESULTS

Each wound subsequently reached complete and definitive closure. Patient A had ulcer closure in 14 weeks with no residual complications. The patient expired on December 25, 2021 due to complications of congestive heart failure. Patient B's wound closed completely in 5 months. There is currently healthy epithelial tissue present and minimal evidence of the previous hematoma or ulceration.

## DISCUSSION

The fragmented and intact fish skin is a homologous structure that maintains chemical and mechanical properties with the benefits of naturally occurring Omega3 polyunsaturated fatty acids. These factors aided in the recruitment of new human skin cells and subsequently complete healing of the post-traumatic ulcerations (Magnusson et al., 2017). There was no rejection or reaction to the graft material for either patient. The fragmented and intact FSGs provided an optimal environment for healing full thickness post-traumatic ulcerations in geriatric patients with fragile skin and arterial insufficiency. More extensive prospective studies should investigate the use of FSG in geriatric populations. warranted.

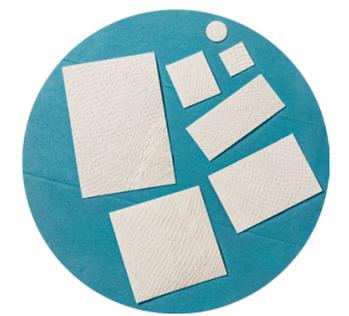


Image of intact fish skin graft\*

References: Baldursson BT, Kjartansson H, Konráðsdóttir F, Guðnason P, Sigurjonsson GF, Lund SH. Healing rate and autoimmune safety of full-thickness wounds treated with fish skin acellular dermal matrix versus porcine small-intestine submucosa: a noninferiority study. *Int J Low Extrem Wounds*. 2015 Mar;14(1):37-43. Bonifant, H., & Holloway, S. (2019). A review of the effects of ageing on skin integrity and wound healing. *British journal of community nursing*, 24(Sup3), S28-S33. Magnusson S, Baldursson BT, Kjartansson H, Rolfsson O, Sigurjonsson GF. Regenerative and Antibacterial Properties of Acellular Fish Skin Grafts and Human Amnion/Chorion Membrane: Implications for Tissue Preservation in Combat Casualty Care. *Mil Med*. 2017 Mar;182(S1):383-388. Wallner, J.; Holtermann, J.; Drysch, M.; Schmidt, S.; Reinkemeier, F.; Wagner, J.M.; Dadras, M.; Sogorski, A.; Houschyar, K.S.; Becerikli, M.; Lehnhardt, M.; Behr, B. The Use of Intact Fish Skin as a Novel Treatment Method for Deep Dermal Burns Following Enzymatic Debridement: A Retrospective Case-Control Study. *Eur. Burn J*. 2022. 3. 43-55.