The Healing Power of Nature

Outpatient reconstruction of traumatic dog bite avulsion injury of the lower extremity with acellular fish graft and negative pressure wound therapy in a two-stage procedure

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INTRODUCTION

Dog bite avulsion injuries are common sources of morbidity requiring initial treatment in the emergency room. Management of skin avulsion injuries of the lower extremity may require coverage with large flaps or skin grafts. Use of Xenograft can be combined with negative pressure wound therapy in a two staged algorithm to optimize coverage of deep structure elements, wound bed preparation and ultimately epidermal regeneration.

METHODS

We performed this technique in a 68-year-old -male who sustained a large full thickness (muscle and fascia) avulsion injury of the left thigh from a pit bull dog attack. Initial treatment in the ED resulted in inadvertent primary closure of the wound. Patient underwent debridement and compartment decompression. Patient was discharged 5 days later to our wound center. An algorithm of pH testing, wound culture, thermal free- tissue excision and hypochlorous acid-soaked white sponge with negative pressure wound vac therapy was applied for 6 weeks. The peri wound was undermined, and a 3 cm free flap sutured over the visible muscle rim. A single layer of meshed acellular fish graft was applied with negative pressure wound therapy and compressive dressings for 2 weeks. Graft incorporation and wound bed viability was assessed at 2 weeks post graft application.

RESULTS

We observed a robust hyper-granular over exposed muscle and fascia within week 2 of NPWV therapy and hypochlorous acid. At week 4, acellular fish graft resulted in complete incorporation, decrease in pain (Numerical Pain Rating Scale of 2), dermal appendage migration and at week 6; complete epidermal coverage. Overall appearance of the reconstructed area was satisfactory at week 7 (Vancouver Scar Scale Score of 9).

CONCLUSIONS

The use of acellular fish graft combined with negative pressure wound therapy is an alternative outpatient reconstructive option for managing extensive traumatic skin avulsion injuries. it reduces postoperative immobilization, avoids prolonged hospitalization, minimizes pain and restoration of functional and esthetic results in a two-stage repair algorithm.

Patient History: 68 y/o male presents with a pitbull bite; subfascial avulsion injury to left calf. E.D management included tetanus, antibiotics, pain management and wound closure and discharge. Patient returns to E.D 2 days later with pain 10/10, swelling and anterior/lateral compartment pressures = 16mmhg. Immediate excision and debridement/washout. Discharged on POD #5

Pmhx: Insulin dependent diabetes mellitus (HbA1C 5.2) , Hepatitis C with HCC

Wound History: Initial – wound center

M- 15 x 8 x4 Ful thickness tissue defect with sub-fascial avulsed tissue

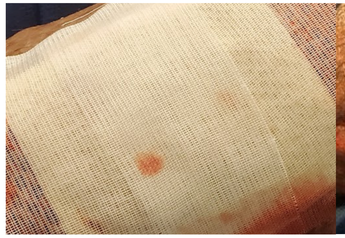
E- Serous exudate, moderate Cultures + Alpha Streptococcus Gram stain – negative Ph- 9

A-90% muscle fibers 5% muscle sheath -yellow non desiccated, 5% granulation tissue, no necrotic tissue visible

S- Pain 7-8/10 with light palpation of peri wound and wound bed

U-Positive undermining

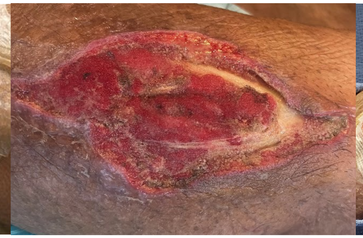
Kerecis Applications: 2 – 7x8 cm meshed 2:1 and 1 – 7x7cm non meshed



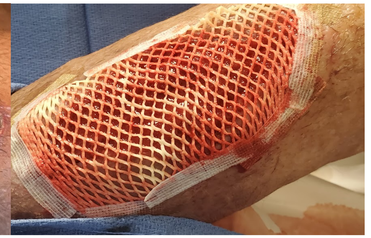
A POD #7 application of acellular fish graft with mesh gauze and NPWV therapy @ 1250mmhg Ph = 8.7

POD #12 12x7.5x3 cm Post NPWV with creation of superior and inferior flaps, acellular fish graft application on muscle fascia Ph = 8.5

Application of NPWV – white sponge soaked hypochlorous acid over muscle, black sponge over muscle fascia



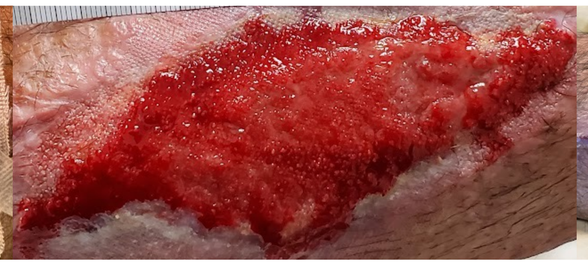
POD# 19 – 11.5x6x2.7cm Robust hyper-granulation response over fascia. Optimal contraction. Ph = 8.6



Acellular fish graft with graft overlapped over peri-wound maceration NPWV applied @125mmhg.

POD# 23 9.5x6x2.5cm - robust granulation response with 100% coverage of muscle and fascia- Excision of hyper-granulation tissue and application of acelluar fish graft. Ph= 8

POD# 27 – acelluar fish graft and NPWV therapy – Note normal thick exudate with graft incorporation



POD# 32 6x3x0cm – excision of hyper-granulation tissue with application of alginate and bacitracin alternating hypochlorous acid soaks. Ph= 7.2

POD# 46 0.5x 1x 0cm with 99% contraction of wound, minimal hypertrophic scarring - silicone gel sheets compression for 2 weeks

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