

# The use of stabilized pure Hypochlorous Acid (pHA) based cleanser in the management of pressure injuries

Michael N. Desvigne, MD, FACS, CWS, FACCWS, Krista Bauer (Montgomery), RN, WCC, OMS, Jody Wolfe, BSN, MBA, RN, CWOCN, Ashley L. Wardman, LPN  
Abrazo Arrowhead Hospital and Wound Clinic, Glendale, AZ

## INTRODUCTION

The use of pure pHA for wound cleansing in the management of pressure injuries is well known and supported by extensive guidelines. Pressure injuries of Stage III and IV are amenable to management via primary closure by a plastic surgeon. We present here the results of real-life clinical cases, of serious pressure injuries including Stage IV, from admission to discharge involving primary closure procedures.

## METHODS

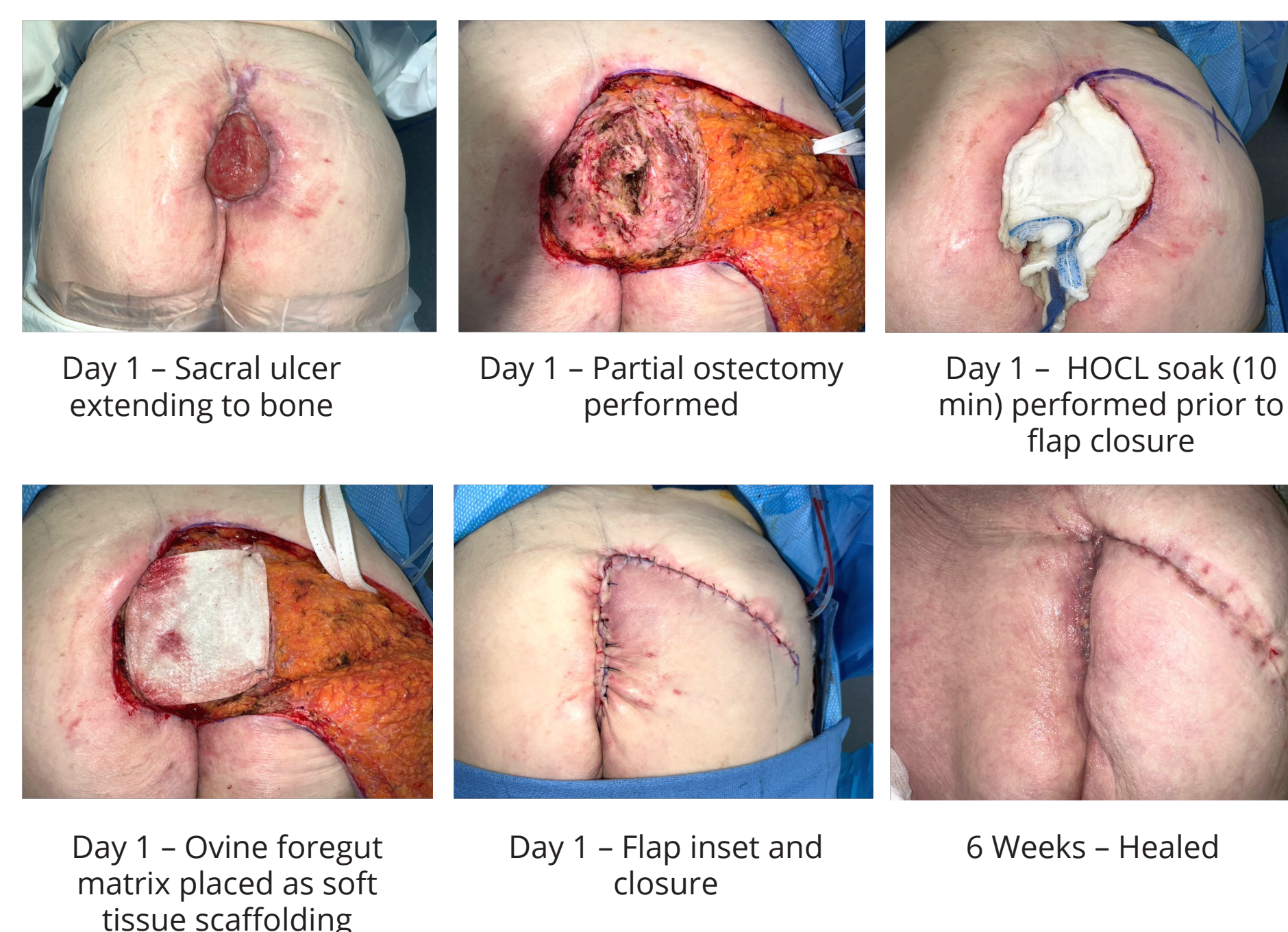
We queried the EMR on Stage IV pressure injuries that a single surgeon who is responsible for primarily closing wounds in a community hospital closed via primary closure over a 24 month period. We assessed how many of these had pHA involvement in wound closure at any time between admit to discharge. The details of these pHA involving cases are presented. pHA was used at clinician discretion based on bioburden levels present in the wound during the initiation and progress of the reconstructive process.

## RESULTS

Figures 1-6 show all the case details on 6 patients. pHA was used when there was concern about bioburden in the wound interfering potentially with the primary closure process and success. Of the six cases, four were successfully healed, one sent to an outpatient facility with NPWT recommendation, and one had flap failure though the allograft incorporation to encourage tissue growth in the defect to fill the ulcer surface succeeded. This patient had very poor nutritional status. This patient's wound is being closed secondarily via advanced non surgical wound care.

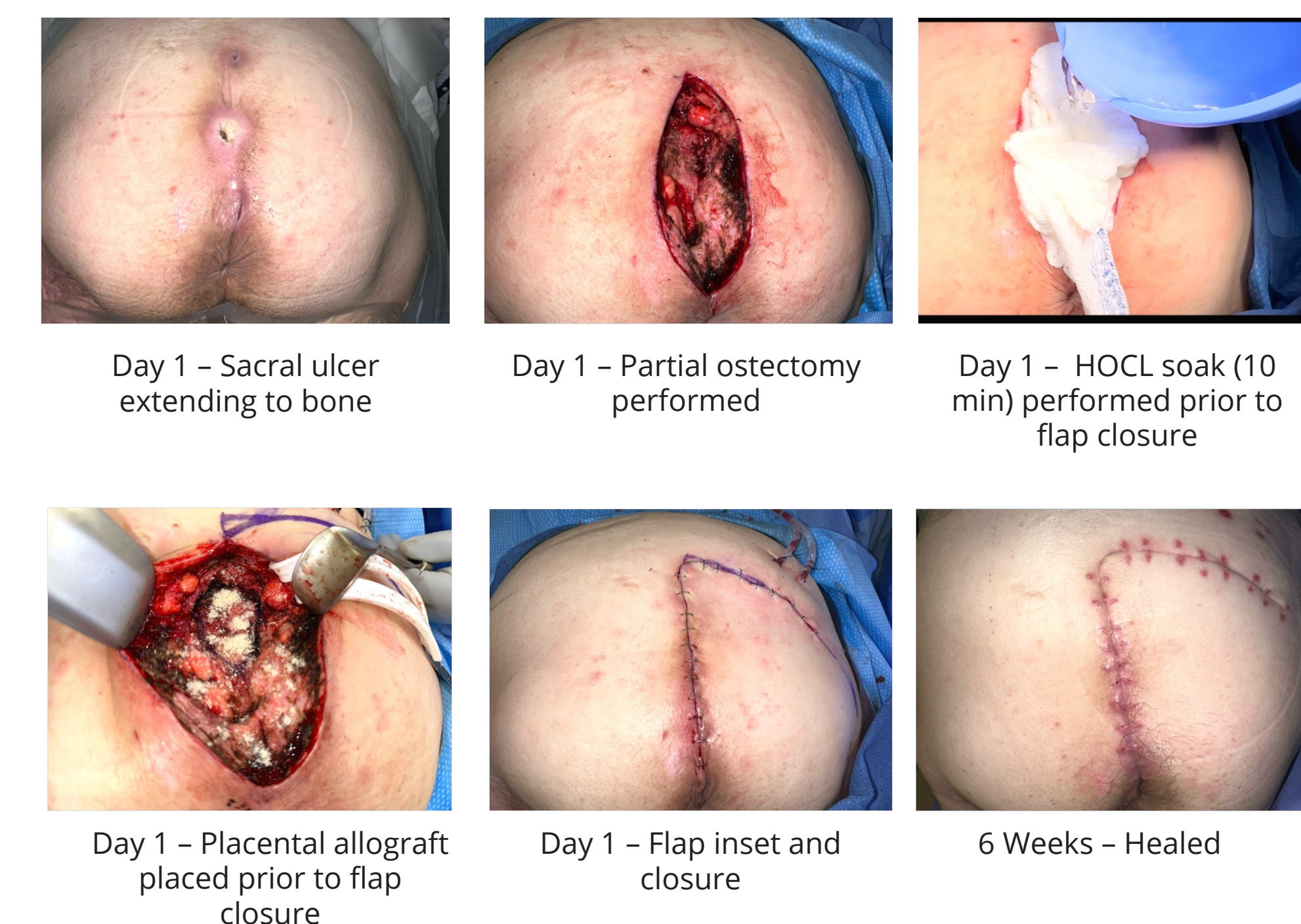
### Case 1 – Sacral Pressure Injury, Stage IV

- 82 yo female with s/p fall with fractured spine developed sacral ulcer, stage 4 that has failed to heal.
- Medical history: Urostomy No CAD, DM, HTN
- Social History: Lives with husband
- Treatment:
  - Taken to OR for surgical closure
  - Excision ulcer with partial osteotomy performed
  - HOCL soak (10 min) performed prior to flap closure
  - Ovine foregut matrix placed as soft tissue scaffolding
  - Placental allograft placed to optimize healing.
  - Incisional V.A.C.® Therapy initiated with a 3M™ Prevena™ Customizable Dressing immediately following closure
- OUTCOME: Healed



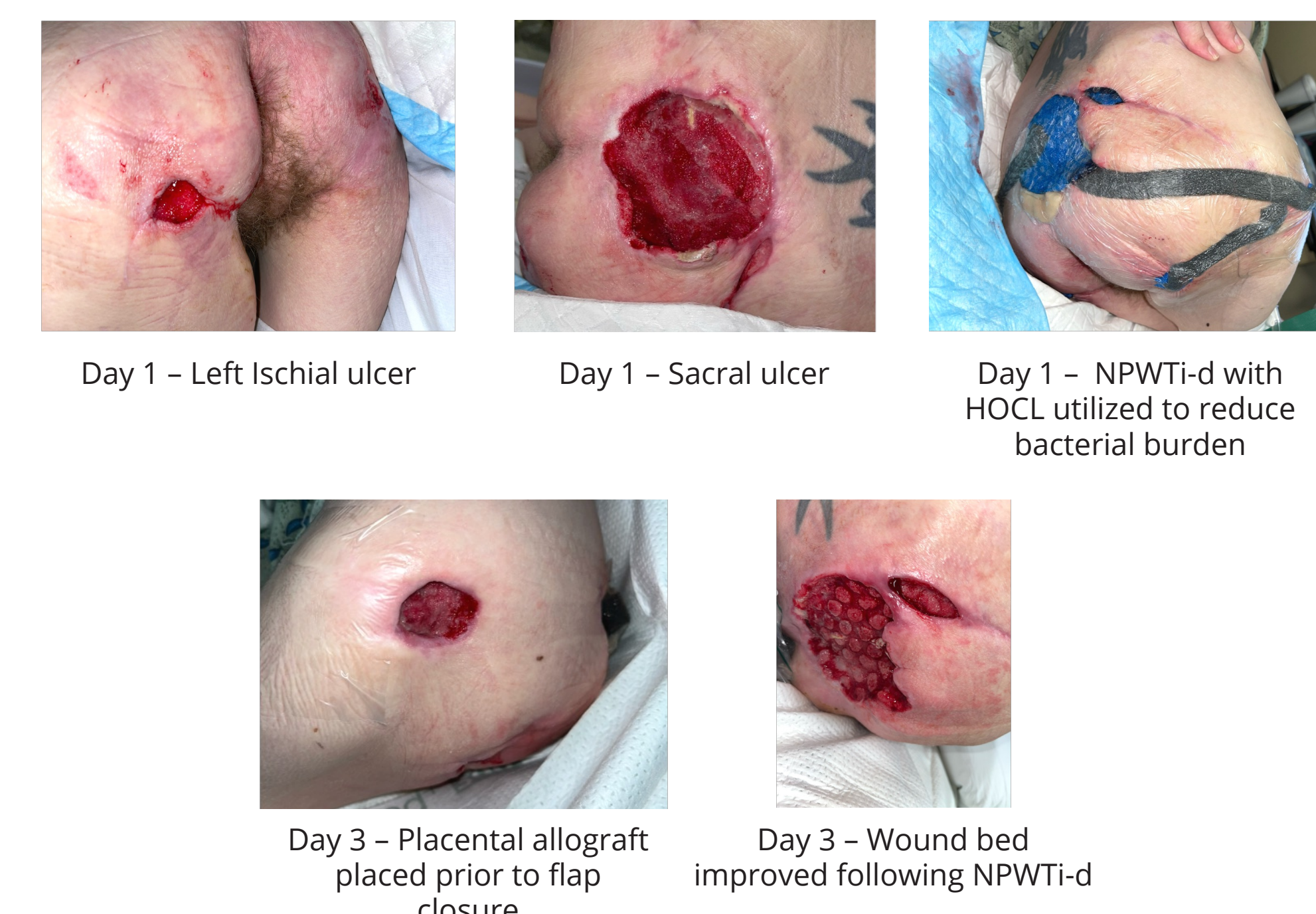
### Case 2 – Sacral Pressure Injury, Stage IV

- 36 yo female with incomplete paraplegia from MVA. Presents with Sacral ulcer, stage 4.
- Medical history: Urostomy, Lupus anticoagulant
- Social History: Lives with family
- Treatment:
  - Taken to OR for surgical closure
  - Excision ulcer with partial osteotomy performed
  - HOCL soak (10 min) performed prior to flap closure
  - Placental allograft placed to optimize healing.
  - Incisional V.A.C.® Therapy initiated with a 3M™ Prevena™ Customizable Dressing immediately following closure
- OUTCOME: Healed



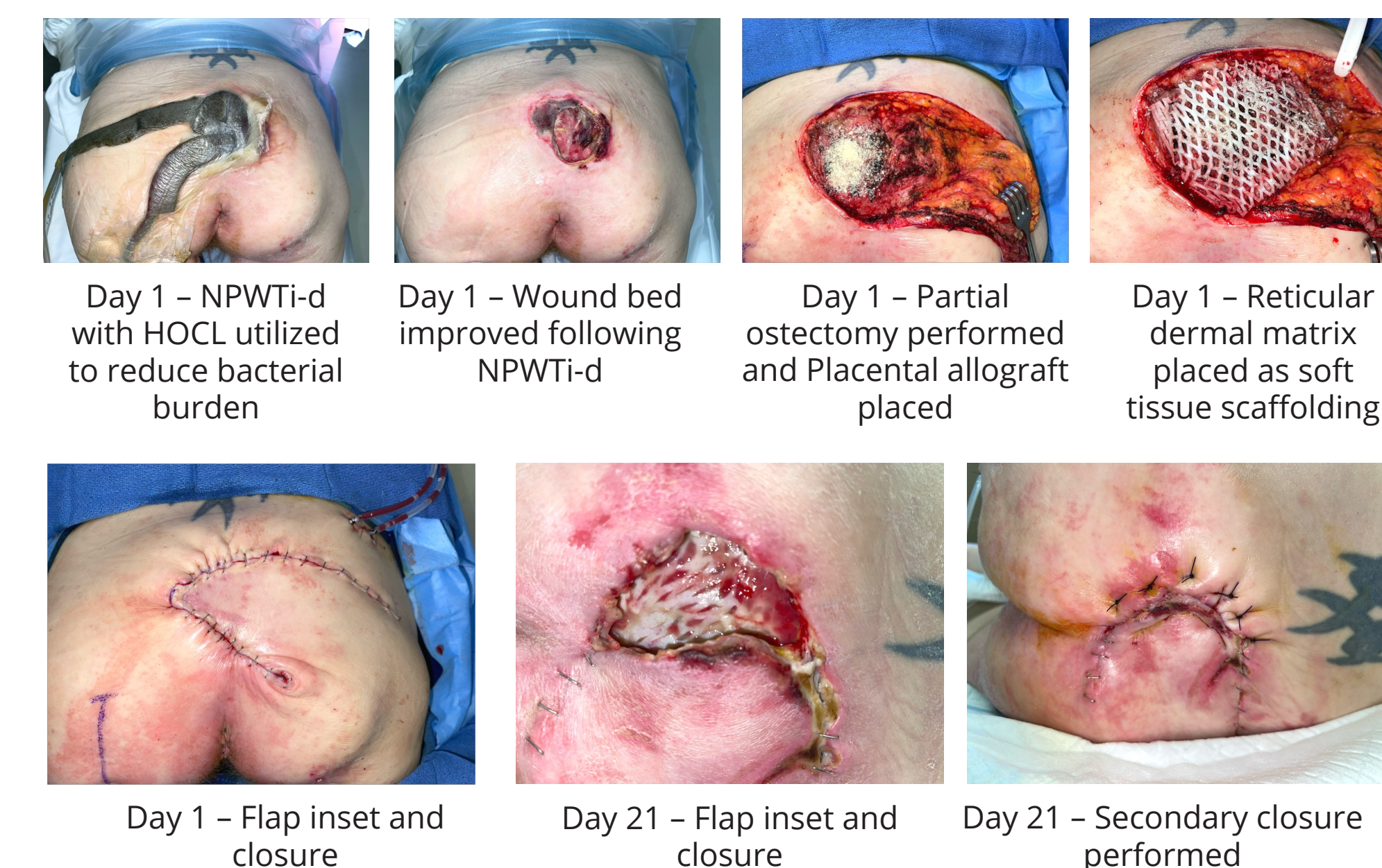
### Case 3 – Multiple Pressure Injuries, Stage IV

- 42 yo female with incomplete quadriplegia from GSW. Presents with multiple pressure ulcers, stage 4 with secondary infection.
- Medical history: Urostomy
- Social History: Lives independently
- Treatment:
  - Admitted for worsening pressure ulcers and secondary infection
  - Pt deemed poor surgical candidate secondary to poor nutrition
  - 3M™ Veraflo™ Therapy initiated with 3M™ Veraflo™ Cleanse Choice Complete™ Dressing
- Outcome: Transitioned to VAC therapy as outpatient



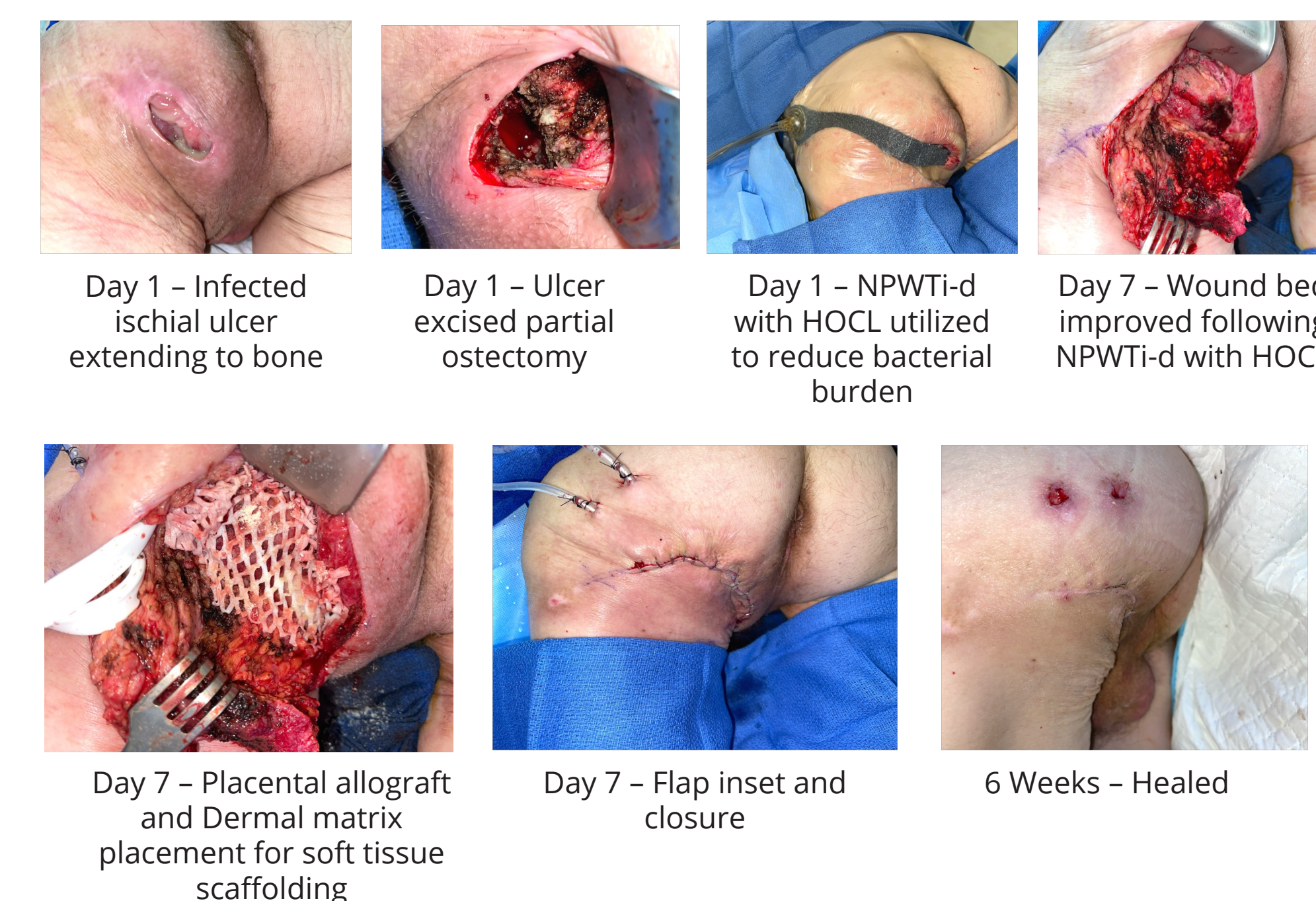
### Case 4 – Sacral Pressure Injury, Stage IV

- 42 yo female with incomplete quadriplegia from GSW. Presents with necrotic sacral ulcer, stage 4. Admitted for surgical intervention.
- Medical history: Urostomy
- Social History: Lives independently
- Treatment:
  - 3M™ Veraflo™ Therapy initiated with 3M™ V.A.C. Veraflo Dressing with HOCL
  - Taken to OR for excision ulcers and flap closure
  - SomaGen dermal matrix placed for tissue scaffolding
  - Salera Placental Allograft placed to optimize healing
  - Incisional V.A.C.® Therapy initiated with a PREVENA™ CUSTOMIZABLE™ Dressing immediately following closure
- OUTCOME: Postoperative dehiscence requiring secondary closure



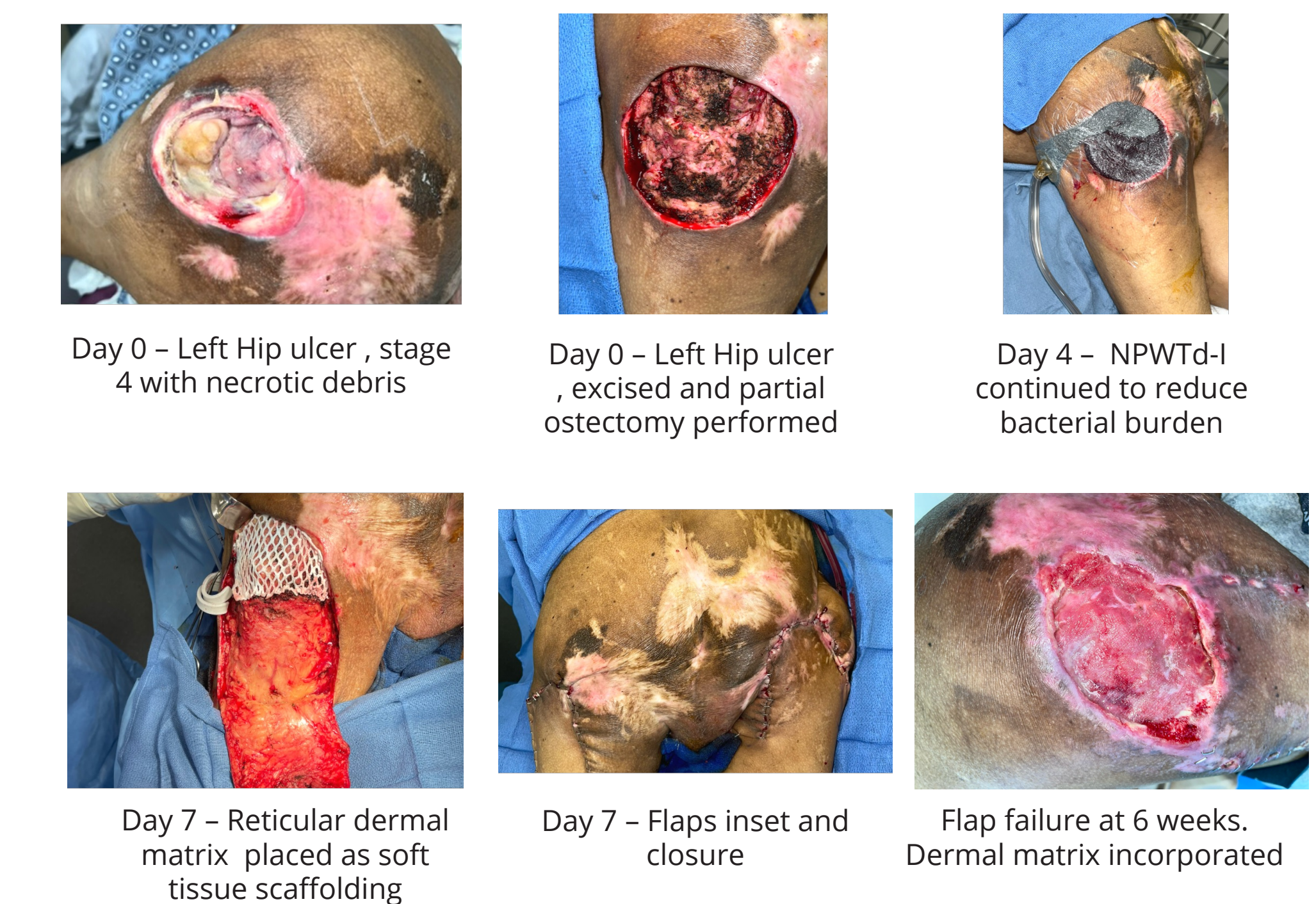
### Case 5 – Left Ischial Pressure Injury

- 53 yo male with paraplegia secondary to traumatic fall 1993 presents with infected pressure ulcer.
- Medical history: Paraplegia, CRI, Depression, Malnutrition
- Treatment:
  - Admitted to hospital for acute infection left ischial ulcer
  - V.A.C.® VeraFlo™ Therapy initiated with Cleanse Choice dressing V.A.C.® and HOCL
  - Taken to OR for staged debridements and VeraFlo™ therapy
  - SomaGen™ dermal matrix placed as tissue scaffolding for soft tissue replacement
  - Salera Placental Allograft placed to optimize healing
  - Incisional V.A.C.® Therapy initiated with a PREVENA™ CUSTOMIZABLE™ Dressing immediately following closure
- OUTCOME: HEALED



### Case 6 – Multiple Pressure Injuries

- 49 yo male with paraplegia admitted to hospital for multiple pressure ulcers worsening despite wound management and offloading.
- Medical history: Paraplegia
- Treatment:
  - 3M™ Veraflo™ Therapy initiated with 3M™ V.A.C. Veraflo Cleanse Choice™ Complete Dressing and HOCL
  - Taken to OR for staged debridement
  - 3M™ Veraflo™ Therapy continued with 3M™ V.A.C. Veraflo Dressing and HOCL
  - Taken to OR for flap closure with reticular dermal matrix placed as tissue scaffolding for soft tissue replacement
  - Placental allograft placed to optimize healing.
  - Incisional V.A.C.® Therapy initiated with a 3M™ Prevena™ Customizable Dressing immediately following closure
- Outcome: Flap failure but dermal matrix incorporated



## RESULTS

Closing of deep pressure injuries such as Stage IV injuries, which are prone to be highly contaminated upon presentation, and even post initial debridement, is fraught with challenge. Such patients are carefully chosen to the primary closure attempt. In spite of the inherent risks involved of failure, by using pure hypochlorous acid-based cleanser, a surgeon is able to close most wounds to satisfaction using primary closure techniques. pHA is a valuable tool in the tool kit of clinicians given its low cytotoxicity, its ability to remove germs, and the potential ability to change the pH of the wound to a mildly acidic, prone to healing environment.

This work was produced with support from Urgo Medical North America.

## REFERENCES

1. Ricci, Joseph A, Lauren R Bayer, and Dennis P Orgill. "Evidence-Based Medicine: The Evaluation and Treatment of Pressure Injuries." *Plastic and reconstructive surgery* (1963) 139.1 (2017): 275e-286e. Web.
2. Khansa I, Barker JC, Ghatak PD, Sen CK, Gordillo GM. Use of antibiotic impregnated resorbable beads reduces pressure ulcer recurrence: A retrospective analysis. *Wound Repair Regen.* 2018 Mar;26(2):221-227. doi: 10.1111/wrr.12638. PMID: 29770531; PMCID: PMC7173798.
3. Maliyar K, Persaud-Jaimangal R, Sibbald RG. Associations Among Skin Surface pH, Temperature, and Bacterial Burden in Wounds. *Adv Skin Wound Care.* 2020 Apr;33(4):180-185. doi: 10.1097/01.ASW.0000655488.33274.d0. PMID: 32195721.
4. Wang L, Bassiri M, Najafi R, Najafi K, Yang J, Khosrovi B, Hwong W, Barati E, Belisle B, Celeri C, Robson MC. Hypochlorous acid as a potential wound care agent: part I. Stabilized hypochlorous acid: a component of the inorganic armamentarium of innate immunity. *J Burns Wounds.* 2007 Apr 11;6:e5. PMID: 17492050; PMCID: PMC1853323.