



**Efficacy of a Disposable Hydrodebridement System*
for Debridement of Burn Wounds: a Retrospective Case Series**

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Huntsville Hospital Outpatient Wound Clinic

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study objectives

Demonstrate the effectiveness of an underutilized disposable hydrodebridement system* in 2nd degree burns

introduction

Debridement is a necessary component of wound bed preparation to stimulate wound healing^{1,2}

- Removes necrotic tissue
- Reduces bioburden
- Stimulates granulation tissue formation

Most debridement methods are not ideal for burn patients due to technological limitations

- Debridement is typically painful and causes anxiety for patients
- Potential to damage healthy granulation tissue
- Some methods require a dedicated room or OR suite

Portable Disposable Hydrodebridement System* addresses technological limitations of other advanced debridement systems³⁻⁵

disposable hydrodebridement systems*

System Components:

- Disposable wand and tubing
- Bag of saline
- Pressurized oxygen (9 – 15 L/min)

Aerosolizes saline with oxygen at safe pressures between 4 and 12 PSI

- Micro drop diameter: 5 – 100 μm
- Velocity: 200 m/s
- Requires only 1.5 ml/min of saline

System is cost effective



methods

Study approved by Huntsville Hospital Institutional Review Committee

- Included all patients with burn wounds that received hydrodebridement between May 2013 – June 2014
- 22 patient records included (50 wounds)
- 8 patient records excluded due to incomplete data
- Age range: 14 months – 61 years old

Patients received hydrodebridement therapy 1 – 3 times a week until hydrodebridement was no longer indicated

- Primary dressings: Silver Sulfadiazine (n=18), Zinc Oxide (n=2),
- Bacitracin (n=2)

Wounds were photographed, measured, and characterized for presence of necrotic tissue and slough at each visit

Modified Kaplan-Meier Survival Curves used to determine probability of complete granulation and probability of healing or hydrodebridement no longer indicated

- Log-rank test and Cox regression used to analyze influence of age and sex covariates

Representative Cases

case 1 - 2nd degree scald burn on right hand of 16 yrs. Female

Day 0 - Pre



Day 0 - Post



Day 6 - 3 Sessions



case 2 - Contact 2nd degree burn on left hand of 17 yrs. Male

Day 0 - Pre



Day 0 - Post



Day 7 - Post



Day 12 - Post



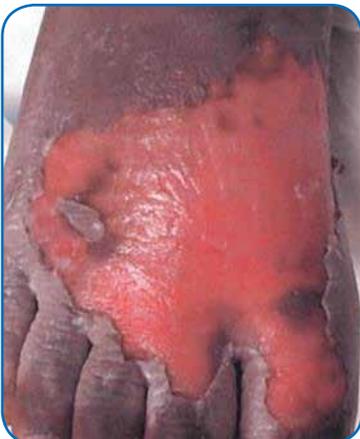
Day 38 - 4 Sessions



- Note effective removal of silver sulfadiazine with hydrodebridement system

case 3 - 2nd degree scald burn on right foot of 8 yrs. Female

Day 0 - Post

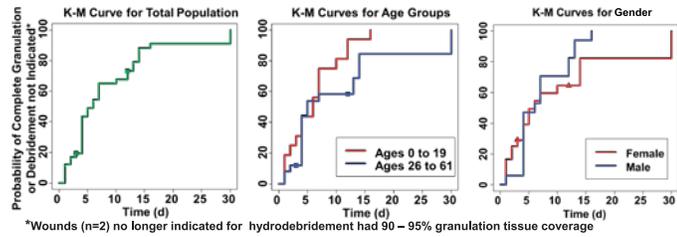


Day 2 - 2 Sessions



- 90% epithelialization of wound after 2 days

Hydrodebridement Stimulates Granulation Tissue Formation



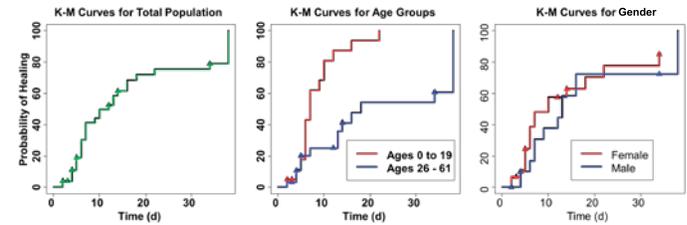
Hydrodebridement induces complete coverage of wound bed with granulation tissue

- Median: 6 days; Range: 1 – 30 days

Patient age and gender do not significantly influence time to complete granulation tissue coverage.

- Cox Regression Analysis: Age $p = 0.056$; Sex $p = 0.296$
- Log Rank Test: Age $p = 0.069$; Sex $p = 0.33$

Hydrodebridement Promotes Wound Healing



Burn wounds healed following hydrodebridement

- Median: 12 days; Range: 2 – 38 days
- Mean wound closure rate: $12.4 \pm 1.69\%$ per day

Patient age significantly influences wound healing time

- $p = 0.0268$, Cox Regression; $p = 0.00061$ Log Rank Test

Patient gender does not effect wound healing time

- $p = 0.42$, Cox Regression; $p = 0.41$ Log Rank Test

discussion

Disposable Hydrodebridement System* effectively removed wound debris and foreign materials

- Highly effective at removing excess silver sulfadiazine or zinc oxide ointment (Case 2)

Effective for a diverse patient and wound population

- Burn wound types: scald, contact, chemical, flame
- Combination wounds (i.e. burn and abrasion, Case 2) effectively treated
- Rate of granulation tissue formation not effected by patient age

Minimal to no pain reported by patients or observed by nurses during hydrodebridement sessions

- Saline stream reported by patients to have cooling effect
- Well tolerated by young patients with little to no resistance

Easy to use and required minimal set-up

- Minimal staff education required to safely perform procedure
- Portability of unit allows debridement to be performed in examination room

conclusions

- Disposable Hydrodebridement System* is effective at debriding 2nd degree burn wounds
- Little to no pain experienced by patients during hydrodebridement procedures
- Rapid formation of granulation tissue demonstrates ability of hydrodebridement to stimulate wound healing

References

- 1: Teot. "Surgical Debridement," in *Surgical wound healing and management*. (2007), 45 -52.
- 2: Cruz et al. *J. Paediatr. Child Health*. (2013) 49, E397-404
- 3: Poiteau et al. *Therapeutique* (2009) 16, 226-229.
- 4: Alamirano *Wounds* (2006) 18, 17.
- 5: Brizzio et al. *Journal of Vascular Surgery* (2010) 51(2), 410-416.

* Jetox® – ND Jet Lavage Wound Cleansing and Debridement System
 DeRoyal Industries Inc, Powell TN)

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