



wet wound

MULTIDEX® POWDER

maltodextrin powder
wound dressing



wet - moist - dry
wound

MULTIDEX® GEL

maltodextrin gel
wound dressing

A wound-healing rate in diabetic foot ulcers in response to treatment with maltodextrin/ascorbic acid wound dressing in outpatient diabetic foot unit Caja de Seguro Social Ciudad de Panama. A case series report.

Study completed by Jorge Puerta, MD; Jennifer Garcia, MD; and Horacio Moreno, MD

Complejo Hospitalario Dr. Arnulfo Arias Madrid

study objectives

The aim of this study was to describe and demonstrate the effectiveness of a diabetic foot limb preservation treatment protocol utilizing sharp debridement, maltodextrin/ascorbic acid dressing, gauze, and limb offloading.

introduction

- Diabetes affects 194 million individuals worldwide¹
- Foot ulceration is one of most common complications associated with diabetes.¹
 - 15% of diabetic patients experience a foot ulcer
 - 7 to 20% of these patients require eventual amputation
- Treatment of diabetic foot wounds is costly due to prolonged care \$4,595 to \$28,000 per diabetic foot ulcer.¹
 - Costs increase to \$40,000 if amputation is required¹
 - Estimated total cost in Panama: \$288.92 Million²
- A protocol is needed to reduce treatment time and burden on healthcare systems, especially in developing countries

introduction: maltodextrin/ascorbic acid dressing

- Dressing in powder and gel formulation
- Initial studies by Silveti demonstrated efficacy for treating traumatic wounds, decubitus ulcers, venous leg ulcers, diabetic ulcers, and 2nd degree burns³
 - Reported cessation of pain, control of infection and purulence, granulation tissue formation and re-epithelialization of wound bed³
 - Additional experiments indicated Maltodextrin has inherent antimicrobial properties^{4,5}
- Others report successful treatment of recalcitrant wounds including: peristomal ulcers⁶, diabetic⁷⁻⁹, surgical, and traumatic wounds⁸, and venous ulcers.¹⁰
- Dressing is inexpensive making it an ideal treatment option in developing countries with limited resources. However, research is limited to case studies and small clinical studies.

methods

- Prospective observational case series approved by the Ethics Committee of Panama's Ministry of Health
- Included all patients with Wagner Stage 3 and 4 diabetic foot ulcers between January 2014 – March 2015
 - 25 patient records included (26 wounds)
- Treatment Protocol
 - Sharp debridement as indicated and wound cleaned with saline
 - Maltodextrin/ascorbic acid dressing applied to the wound bed
 - Powder for moist/wet, gel for dry wounds
 - Cotton gauze used as secondary and appropriate offloading applied
 - Patients and care givers trained to change dressings daily
- Wounds were photographed and analyzed with digital planimetry at all follow-up visits.
- Healing trajectories and Modified Kaplan-Meier Survival Curves used to quantify granulation tissue formation and healing of the wound.

Representative Cases



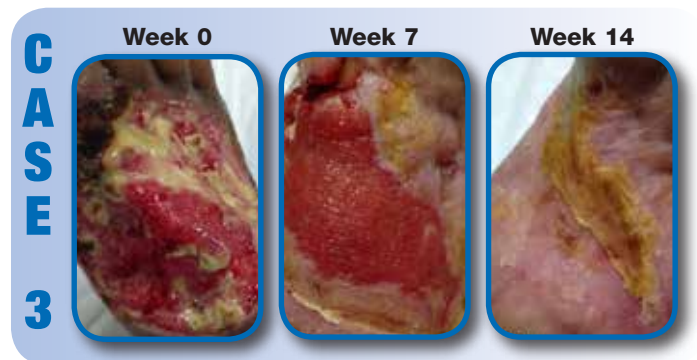
Post transmetatarsal amputation.

Week 0: Initial area: 30.94 cm², Granulation tissue: 72%.
Week 11: Area 4.52 cm² (85% closed), Granulation tissue: 100%.
Week 16: Healed



Surgical Relief of Abscess.

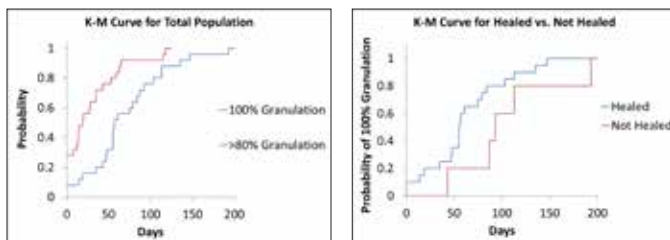
Week 0: Initial Area: 6.93 cm², Granulation tissue: 100%
Week 3: Area 3.68 cm² (47% closed), Granulation tissue: 100%.
Week 7: Healed



Right Dorsum Wound with PVD.

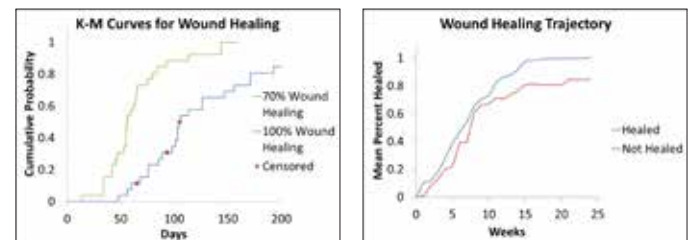
Week 0: Initial Area: 32.45 cm², Granulation tissue: 58.1%,
Week 7: Area 4.52 cm² (85% closed), Granulation tissue: 100%.
Week 14: Healed

Complete Granulation of Wounds Observed in Study



- **Complete granulation of all wounds was observed**
 - 100% Median: 57 days; Range: 0 – 193 days
 - 80% Granulation Median: 19 Days; Range: 0 - 118
- **Non-healing wounds were delayed in granulation tissue formation**
 - Healed Median: 55.5 days; Range: 0 – 147 days
 - Not Healed Median: 93 days; Range: 43 – 193 days
 - Log Rank Test demonstrates trend towards significance (p=0.094)

Treatment Protocol Promotes Wound Healing



- **All wounds experienced at least 70% wound closure**
 - 70% Healing Median: 56 days; Range: 14 – 144 days
 - 100% Healing Median: 103 days; Range: 48 – 193 days
 - Non-healing wounds (n=5) resolved through grafting after 100% granulation and 70% healing
- **Wound healing trajectories predict 6-7% weekly healing rates**

discussion

A wound treatment protocol utilizing debridement, maltodextrin / ascorbic acid dressing, gauze, and offloading led to rapid wound healing of stage II, III, and IV diabetic foot ulcers.

- 21 of 26 wounds healed
- 5 unhealed wounds achieved 70% size reduction and 100% granulation before resolution with grafting

Rapid formation of granulation tissue and re-epithelialization of the wound bed in treated wounds demonstrates protocol creates ideal conditions for wound healing.

- Multidex demonstrated to establish a moist wound environment conducive to wound healing
- Sharp debridement removed slough and necrotic tissue
- Offloading prevented re-injury of the wound bed during healing

Protocol demonstrates the ability to salvage limbs following diabetic ulceration.

- Successfully healed 10 post transmetatarsal amputation wounds (case 1)
- Potential to save \$20 million in Panama alone by preventing full limb amputation

conclusions

- Rapid wound healing was seen for stage II – IV diabetic foot wounds utilizing described treatment protocol.
- The maltodextrin/ascorbic acid dressing established an ideal moist environment ideal for wound healing.
- The protocol is cost effective for developing countries with socialized healthcare systems as the maltodextrin/ascorbic acid is inexpensive.

References

- 1 Frykberg et al. J Foot and Ankle. 2006
- 2 World Bank 2012
<http://databank.worldbank.org/data/home.aspx>
- 3 Silveti J Dermatol Surg Oncol. 1981
- 4 Silveti FASEB 1993 p A1251
- 5 Silveti Federation Proc 1987 p A3898
- 6 Bonham and Schaffner J WOCN 1999
- 7 Earles and Smiddy J WOCN 2003
- 8 Brunette J WOCN 2012
- 9 Palec J WOCN 2012
- 10 Krotzch et al. Wound Repair Regen 2005
- 11 Robson et al. JAMA Surgery 2000
* Multidex® (DeRoyal Industries. Powell TN)
This work has been made possible by
an education/research grant from DeRoyal Industries.



for a free sample, visit

MULTIDEXSAMPLES.COM

restrictions apply. see website