

# Limb Threatening Acute Right Small Toe Diabetic Ulcer with Infected Bone and Ascending Infection

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## Problem

- Ascending infection of right forefoot, 5 days in ICU for IV antibiotics
- Diabetic right 5<sup>th</sup> toe ulcer with infected bone on culture and MRI of right foot
- Diabetic neuropathy with almost no sensation in right foot.

Day #0



Diabetic ulcer on right small toe is obscured by macerated hyperkeratotic skin. Ascending cellulitis of foot and edema are still evident after five days of in-hospital treatment with IV antibiotics. A bone culture of the small toe was positive for infection with no evidence of forefoot necrotizing infection.

Day #0



Skin was prepped with topical hypochlorous acid (NeutroPhase®, Nova Bay) Using a curette, macerated hypertrophic hyperkeratotic skin was gently removed from around the ulcer with no patient discomfort. The ulcer cavity was irrigated with NeutroPhase® spray before gentle curettage of the ulcer wall and base was performed, yielding gritty necrotic fragments of bone.

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Day #0



Small shards of necrotic bone can be seen in this poorly focused photograph as the neuropathic ulcer is irrigated during curettage.

Day #0



Debridement is terminated when patient starts perceiving pain. Observe her flip flop footwear.

## Limb Threatening Acute Right Small Toe Diabetic Ulcer with Infected Bone and Ascending Infection

Day #6



Six days after debridement and irrigation with Hypochlorous acid, HOCL, PIC line IV antibiotics via home nursing visits, and non weight bearing with crutches, the foot looks dramatically better. Three observations:

1. Pain, swelling, and redness have disappeared
2. Hyperkeratotic skin has partly closed the wound, a sign that the small toe wound is able to respond
3. Forshortening of the toe as a result of the piecemeal debridement and removal of the fifth proximal phalanx bone six days before.

Debridement #2 is performed with NeutroPhase® irrigation

Day #19



Weekly debridement #4 is underway. Importantly, cartilage from the 5<sup>th</sup> metatarsal head can be seen in the curette spoon. In principle, open toe amputations heal better when the metatarsal cartilage surface is removed to expose cancellous bone at the distal metatarsal. Cartilage dies when exposed to sunshine in the base of open wound. Additionally, exposing cancellous bone allows stem cells to participate in regenerative healing.

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Day #25



Wound cavity probes to 6 mm and is filled with granulation tissue. Debridement #5 was performed with a rongeur to remove skin overgrowing. Fragments of cartilage were seen in the HOCl irrigation effluent.

Day #34



Treatment to this point:

1. IV antibiotics
2. 5 Bone debridements, with a rongeur and NeutroPhase hypochlorous acid irrigation, in the wound center. Her foot is insensate due to diabetic neuropathy so aggressive debridement was easy to do.
3. No weight bearing crutch ambulation and offloading to the distaff foot with a Darby shoe
4. EdeamWear® stockinet to control swelling

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Day #34



Wound following debridement #6. Bone and cartilage fragments are no longer being removed. The decision was made to use advance modalities. Hyperbaric oxygen was considered but patient is claustrophobic and has dialysis three days a week making for impossible transport logistics. Continuous oxygen diffusion therapy was initiated.

Day #48



Debridement #7 was superficial, the prior granulation filled cavity had closed.

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Day #54



Eschar over wound was removed.

Day #10 of EO2 Oxygen Diffusion Therapy



Observe the wound appears 100% healed. EO2 Rx was discontinued

Day #64



Patient returned to work 7 days ago. Patient is discharged from wound clinic. In four weeks, a return visit is scheduled. A sedimentation rate will be ordered and a foot x-ray to rule out the possibility of recurrent bone infection.