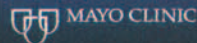


Treatment Of Web Space Ulcerations With Low Frequency Non-Contact Ultrasound



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Introduction

Web space ulcerations are a challenge in clinical practice, especially when treating elderly, compromised patients. There is little written in the medical literature pertaining to the standard of care in treatment. Web space ulcerations are most common in the fourth interspace of the foot. Due to body habitus, the initial development of skin breakdown may go unnoticed. Maceration of the interspace is usually followed by a Tinea infection and then a secondary bacterial infection may ensue. This process can lead to a plantar space infection necessitating urgent surgical intervention to prevent limb loss, additional morbidity and mortality. Friction between the adjacent fourth and fifth toes adds to the mechanical etiology of the ulceration. Medical comorbidities, diabetes mellitus, peripheral arterial disease and neuropathy increase the like-lihood of developing ulceration of the web space. These cases summarize the use of low frequency non-contact ultrasound in the treatment of web space ulcerations of the foot. This technology appears to be beneficial in the treatment of challenging inter-digital ulcerations that can lead to deep, plantar space infections and ultimately, amputation.

Methods

Low frequency non-contact ultrasound (Celleration, Inc., MIST™) was used to treat three patients with web space ulcerations. Frequency of treatment was a minimum of three times a week; the average duration was five minutes per session. Sharp debridement was accomplished on a weekly basis. Oral or parental antibiotic therapy was instituted as indicated by deep culture and clinical signs of infection. Patients had their wounds packed with cotton packing strips and DAB's solution (Polymixin, Neomycin, Gentamycin) three times a day.

Results

Case 1

- 79 year old woman with Diabetes Mellitus, neuropathy, and PAD
- Previous contralateral BKA secondary to ischemia and infection
- TcPO₂'s of index foot ulcer confirms chronic critical limb ischemia
- There were no options for vascular reconstruction or interventional angioplasty
- Index ulcer - October 29, 2001
- Measurement of 13mm x 15mm x 7mm
- Received low frequency non-contact ultrasound therapy five times a week
- DABs dressing TID
- Ulcer healed - February 8, 2002



October 29, 2001



February 8, 2002

Case 2

- 64 year old male with D.M., neuropathy, and PAD
- Recent revascularization of the lower extremity
- Developed compartment syndrome postoperatively
- Ray amputation secondary to osteomyelitis with open web space wound
- TcPO₂'s of less than 20 in the foot
- Index wound - March 3, 2005
- Measurement: 13mm x 39mm x 12mm
- Received low frequency non-contact ultrasound therapy three times a week
- DABs dressing TID
- Ulcer healed - July 6, 2005



March 3, 2005



July 6, 2005

Case 3

- 73 year old female with advanced sensory peripheral neuropathy, lymphedema and atherosclerosis
- Previous syndactylization of fourth and fifth toes due to painful soft corn
- Index ulcer - March 9, 2005
- Measurement: 12mm x 10mm x 12mm
- Received low frequency non-contact ultrasound three to five times a week
- DABs dressing TID
- Ulcer healed - July 3, 2005



March 9, 2005



July 3, 2005

Low Frequency Non-Contact Ultrasound MIST™ Therapy



Conclusion

The use of Low Frequency Non-Contact Ultrasound (MIST™) is an effective therapeutic modality to improve the healing of web space wounds and ulcerations when added to standard therapy. We were able to demonstrate that using this technology reduced the healing time in compromised patients and appeared to minimize recurrent infections during the healing process. Most importantly, further aggressive treatment such as amputation was avoided.