

Background

•Peripheral artery disease (PAD) is associated with an increased risk of mortality, cardiovascular disease, functional limitation, and major or minor limb loss. Approximately 185,000 amputations have been estimated to occur in the United States every year.

•Limb amputations in these patients are often complicated by wound infection and/or dehiscence, which can be associated with bone exposure and de facto clinical osteomyelitis.

•Patients with clinical stage 3 and 4 WIfI have significant higher incidence of amputation, decreased amputation-free survival rate, and delayed wound healing time¹.

•Treatment of these stumps is extremely complicated, and frequently leads to more proximal amputation and significant functional impairment. Proximal extension of major amputation has severe negative impact on the patient's quality of life and overall functional status².

•Use of multidisciplinary limb salvage teams and individualized treatment of CLTI patients coupled with the use of advanced wound healing products has shown to improve wound healing rates offering longer amputation free-survival³.

Methods

•Medical records of 16 patients that presented at the Stony Brook Limb Preservation Center and wound care clinic from 2017-2020 were reviewed.

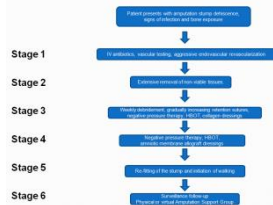
•All patients had dehiscence or disruption of amputation stumps with bone exposure.

•All patients opted to be treated with a conservative approach rather than more proximal amputation.

•Our approach included optimized medical therapy, revascularization procedures, serial wound debridements and advanced wound care techniques with the use of negative pressure therapy, hyperbaric oxygen and application of skin substitutes.

•All patients were functional at baseline and they used to be ambulatory before wound development and were willing and committed to walk.

Proposed Treatment Algorithm



Clinical cases



A 67 year-old man with left BKA stump skin necrosis, wound dehiscence and osteomyelitis. He initially underwent endovascular intervention and debridement of the wound with bone exposure, followed by serial debridements with retaining sutures, and vac therapy with black sponge for 7 weeks. Applications of dehydrated amnion/chorion allografts were consequently performed, leading to complete healing after 6 months of total treatment .



A 75 y/o male patient presented with dehisced TMA with 4 exposed metatarsals, and pseudomonas infection. He underwent revascularization procedure, followed by serial washouts, debridements, wound vac application, retention sutures, with Collagen dressings applications, followed by Placental wound dressings, with complete healing of the stump.

Results

•16 dehisced amputation stumps were included; AKA x2, BKA x4, Trans-metatarsal x3, Ray amputations x7

•Average defect size 22 cm²

•12 males, 4 females. Mean age 70.7 years

•Comorbidities; HLD 100%, HTN 88%, DM 68%, CAD 44%, ESRD 6%.

•Amputation stump with bone exposure 100%

•87.5% presented in clinic, 12.5% in ED

•Complete healing was achieved in 100%. All patients developed walking routines following completion of treatment.

•Mean healing time; 231 days (median 189, range 57-588).

•Nearly all of our patients received revascularization intervention to improve peri-wound blood flow, depending on the location of their arterial occlusive disease and the kind of amputation.

•Follow-up up to 3.5 years; 2 pts (12.5%) had recurrence from pressure points during stump/prosthesis use (at 101 and 231 days). 4 patients passed away during follow-up period (CVA 3 patients, MI 1 patient).

•Stumps free of ulceration; 472 days (median 445, range 55-1080)

Treatment modality	Mean applications	Mean days on treatment
Negative pressure therapy	4.7	27
HBOT	30	98
Collagen substitutes	9.1	74
Amnion/chorion substitutes	9.5	68

Discussion/ Conclusion

•Preservation of maximum functional limb length in amputees can be achieved with a multidisciplinary team approach.

•Amputation wound dehiscence with bone exposure can be treated and is NOT always a reason for more proximal amputation and further limb loss.

•The described approach, provides excellent results, and incorporates established (debridement, negative pressure therapy) as well as recent advanced (Biofilm prevention dressings, and growth factor providing placental coverings) to achieve total defect closure in patients with dehisced amputation stumps with bone exposure.

•This approach also, further shows the importance of a multidisciplinary view point, and a close cooperation of an Advanced wound healing and a Limb preservation center, to heal these challenging patients.

•Compliance to the treatment affects the outcome. Patient needs to be informed, educated, guided and encouraged before hand and during the course of treatment. Close monitoring during and after treatment is necessary for optimal results.

Future Direction

•Development of placental allograft with more potent anti-inflammatory and proliferating properties to accelerate defect closure, especially with large defect wounds.

Further Readings/ Citations/

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6. Rudolfker et al. Curr Cardiol Rep. 2018; 20 (9): 74.
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