Experience with flowable porcine Urinary Bladder Matrix (UBM) in podiatric wounds: a multi-center case series Rikesh Patel, DPM⁺¹; Tyler D. Sten, DPM⁺²; Jessica L. Evans, MD, MS³; Hannah Baker, PhD³, Malachy Asuku^{*}, MD, FACS, MBA^{3*}; Yifei Dai, PhD³; Claire E. Witherel, PhD³

¹Northern Illinois Foot and Ankle Specialists ²Pivotal Foot and Ankle Surgeons

ABSTRACT

INTRODUCTION: undermining and Tunneling continue to complicate podiatric wound management. Cellular, acellular, and matrix-based products (CAMPs) are often utilized as a part of standard of care to achieve wound closure in complex podiatric wounds.

Recently, a flowable delivery configuration of the UBM particulate was cleared for use with the same indications, including ulcers and surgical wounds with tunneling and undermining.

METHODS. This multi-center case series captures the initial experiences of two foot and ankle surgeons' initial cases utilizing flowable porcine UBM in six patients. Pertinent patient demographics, history, wound size, notes on device handling and application, and available early follow-up outcomes (>/= 90 days), including time to closure were collected.

six patients showed clinical **RESULTS**. improvement following use of the flowable UBM device. Four patients attained wound closure following R Approximately one month after one or two applications within a 12-week timespan. One patient was lost to follow up and another is actively undergoing treatment.

CONCLUSION/DISCUSSION. Early reporting on the flowable configuration of UBM as described in this series of complex podiatric wounds reinforces prior findings with UBM deployed as a paste. This series motivates further research on flowable UBM in podiatric wound indications complicated by tunneling and undermining.



Rikesh Patel, DPM Northern Illinois Foot and Ankle Specialists

Tyler D. Sten, DPM **Pivotal Foot and Ankle Surgeons** +Corresponding Author

³Medical Affairs, Integra LifeSciences Corp., Plainsboro, NJ || +Corresponding Author || *presenting author



Approximately one month after presentation with two more OR debridement and two applications of MicroMatrix Flex. C. Approximately two months presentation five interval D. Nine months after debridements. presentation. Patient fully ambulatory in CROW boot.

Fig 2. A. After staged fibula resection with muscle flap creation and ex-fix placement. One application of MicroMatrix Flex. B. One month later. Two interval debridements with a second application of MicroMatrix Flex. (Two months after flap creation with an additional debridement and STSG. D. Five months after flap creation. Two interval office debridements. E. Ten months after flag debridements creation 16 total placement of additional advanced substitutes.

Patient Sex, Age	Patient Comorbidities	Wound Type	Initial Wound Size (post- debridement)	Number of Product Applications	Time to Closure (weeks)
Male, 66	Type II DM, PVD, osteomyelitis, neuropathy	Plantar 5 th metatarsal diabetic wounds	3.2cm x 1.9cm x 2.0cm	1	11 weeks
Male, 99	Severe PAD	Plantar 5 th metatarsal pressure wound	2.5cm x 2.5cm x 2.5cm	1	~6 months (LTFU)
Male, 41	Type II DM, Charcot foot, obesity, PVD, toe amputation on right foot	Plantar 1 st metatarsal head diabetic wound	1.6cm x 1.6cm x 0.4 cm	1	5 weeks
Male, 60 (Fig.1)	Type II DM, hypertension	Acute Charcot event of right foot with abscess and infection	23.5cm x 2.5cm x 2.5cm	2	12 weeks
Female, 40 (Fig. 2)	Celiac disease, chronic osteomyelitis, claustrophobia, COPD, Type II DM, GERD, history of DVT, hypertension, liver disease, lymphedema, neuropathy	Non-healing ulceration for 3 years following bimalleolar ankle fracture with ORIF that dehisced down to bone. Limb salvage attempt with large fibula resection, peroneus brevis muscle flap with external fixer replacement and hindfoot fusion with tibiotalocalcaneal nail	9.0cm x 4.0cm x 0.4cm	2	Ongoing
Male, 40 (Fig. 3)	Type II DM	Charcot food deformity, large plantar ulceration; partial midfoot amputation with local rotational flap	7.0cm x 4.0cm x 1.0cm	1	10 weeks

Table 1. Multi-center cases series data including patient demographics, wound type and size, product applications, and time to closure. DM: diabetes mellitus, PVD: peripheral vascular disease, PAD: peripheral artery disease, LTFU: lost to follow up, COPD: chronic obstructive pulmonary disease, GERD: gastroesophageal reflux disease, DVT: deep vein thrombosis, ORIF: open reduction internal fixation



REFERENCES 1. LeCheminant J, Field C. Porcine urinary bladder matrix: a retrospective study and establishment of protocol. Journal of Wound Care. 2012;21(10):476,478-480,482. 2. Underwood P, et al. Extending limb salvage after fourth and fifth transmetatarsal amputation in diabetic foot infections using ACell® Urinary Bladder Matrix. Am Surg. 2020. Epub ahead of print. doi:10.1177/0003134820973730. 3. Paige JT et al. Modulation of inflammation in wounds of diabetic patients treated with porcine urinary bladder matrix. Regen Med. 2019 May;14(4):269-277. doi: 10.2217/rme-2019-0009. Epub 2019 Apr 25. PMID: 31020913; PMCID: PMC6886567. 4. Cotler HM, Baker HB. Urinary bladder matrix devices support closure in complex sacral wounds. Wounds. 2023;35(9):E287-E289. doi:10.25270/wnds/23087

DISCLOSURES. JE and MA are employed by Integra LifeSciences; HBB and CEW are employed by and hold stock in Integra LifeSciences.











Fig 3. A. OR excision of plantar ulceration prior to closure. B closure Wound achieved. MicroMatrix Flex application. C. Two months after presentation, after four clinical debridements. D. Three months after presentation and eight total debridements with resolution of wound.