

A Novel, Less-Invasive Treatment Option for Traumatic Fingertip Amputations

Carlton Clinkscales, MD, J. Logan Brock
Hand Surgery Associates, Englewood, CO

Introduction

Fingertip Amputations

- Treatment options for traumatic fingertip amputations include several surgical techniques: full-thickness skin grafts, thenar flaps, V-Y flaps, volar advancement flaps, homodigital or heterodigital neurovascular island flaps, and cross-finger flaps (Plast Reconstr Surg 2008)
- Healing by secondary intention is equally effective (Hand 2014)
- No studies have conclusively shown that surgical treatment is superior to healing by secondary intention (Hand 2014)

Porcine Urinary Bladder Matrix (UBM) Powder

- Obtained by harvesting, decellularizing, and purifying lamina propria of porcine bladder (J Wound Care 2012)
- Recruits “alternatively-activated” macrophages (Acta Biomater 2012)
- Possesses inherent antibacterial properties (Tissue Eng 2006)
- Accelerates healing in a number of wound care settings and promotes the formation of tissue resembling native, non-scar tissue (Wounds 2014)

Hypothesis:

Powdered porcine UBM is safe, effective, well tolerated, and provides successful healing while preserving maximal length of traumatic fingertip amputations

Methods

- IRB waiver obtained
- Traumatic fingertip amputations treated with porcine UBM powder were reviewed
- Amputations were treated with irrigation and debridement, followed by the application of powdered porcine UBM (MatriStem MicroMatrix, ACell, Columbia, MD) and dressed with a water-based lubricant and a nonstick dressing
- UBM powder was reapplied every 2-3 days until the fingertip was completely healed
- By chart review, time to healing, location of injury, comorbidities, complications, and patient satisfaction were recorded

Results

Patient	Age	Gender	Chief Complaint	Comorbidity	Number of Applications	Time to Healing (Days)	Complications
1	27	F	Left SF amp	Smoking	9	31	None
2	49	F	Right Th amp	Depression, Hepatitis B	15	DNR	None
3	50	M	Left IF amp	None	6	12	None
4	70	M	Right IF amp	Coumadin, Thyroid Disease	3	63	None
5	5	M	Right IF amp	None	17	33	None
6	38	M	Left SF amp	Smoking	17	111	None
7	24	M	Left MF amp	None	31	76	None

Table 1: Patient Data
Descriptive data on the patients examined in this case series. All patients presented to the clinic with traumatic fingertip amputations. The average time to healing in this series was 54.33 days, with a standard deviation of 33.03 days. Time to healing varied with the severity of the injury.



Figure 1:
(A) 24-year-old male with left middle finger amputation from a saw injury (B&C) Initial UBM powder application (D&E) Final healing with good length and full range of motion after 31 applications

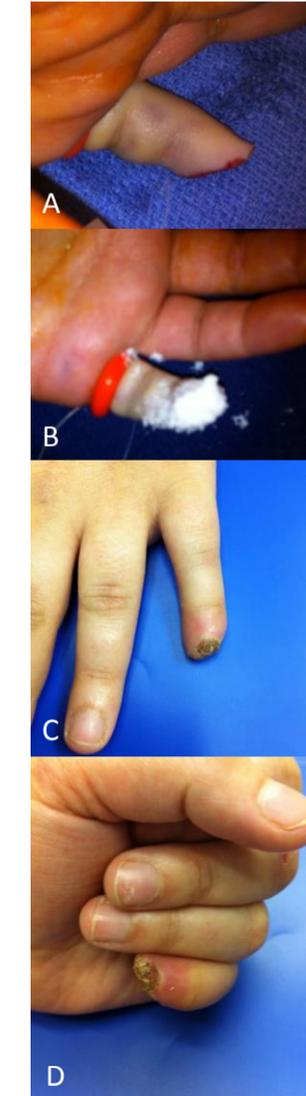


Figure 2:
(A) 27-year-old female with left SF amputation (B) Initial UBM powder application (C&D) Final healing with good length and range of motion after 9 applications

Summary

- No complications were encountered
- All patients who returned for follow up displayed excellent healing
- UBM powder was well tolerated
- Maximal length was preserved
- Treatment was effective even in patients with significant comorbidities

Conclusion:

Application of porcine UBM powder can be used effectively and safely to treat traumatic fingertip amputations

Future Directions

A larger cohort for a prospective, randomized trial comparing porcine UBM powder application to other treatment strategies