

Extracellular Matrix Technology for Assessing Wound Protease Concentrations

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INTRODUCTION

Chronic wounds are characterized by elevated wound proteases that act against the healing process to degrade tissue and stall healing [1]. Advanced Extracellular Matrix (ECM) technologies for wound care are known to act on all phases of wound healing, by providing a provisional scaffold to stabilize the wound bed, modulate wound proteases and rebuild damaged tissue. ECM technologies mimic the ECM in tissue, and as such, these products do not gel on contact with the wound bed. Instead, they persist longer in the wound bed and are more resistant to wound proteases compared to reconstituted collagen products [2]. Just like tissue ECM, ECM technologies are susceptible to degradation when exposed to elevated proteases. As such, the following case series sought to validate ECM as an indicator of wound proteases.

METHODS

Patients (n=15) with a range of chronic wounds and different wound protease concentrations, were debrided per institutional guidelines, then two layers of antimicrobial ECM† applied to the wound bed. Wounds were dressed, then the wound beds imaged at 3 and 7 days. The amount of residual ECM at days 3 and 7 was qualitatively assessed by blinded reviewers and correlated to wound chronicity and wound proteases.

REFERENCES AND DISCLOSURES

1. Bohn GA, Schultz GS, Liden BA, Devigne MN, Lullave EJ, Zilberman I, et al. Proactive and Early Aggressive Wound Management: A Shift in Strategy Developed by a Consensus Panel Examining the Current Science, Prevention, and Management of Acute and Chronic Wounds. *Wounds*. 2017;29(11):S37-S42. 2. Gibson MC, Cullen B, editors. *Can Natural Materials Be Adapted to Optimize Their Efficacy in Wound Care?* Symposium for Advanced Wound Care - Fall; 2014; Las Vegas, Nevada, USA. Financial support was provided by Aroa Biosurgery Limited (New Zealand). †Endoforn Antimicrobial Dermal Templates; ‡Hydrofera Blue; www.appulsemed.com

RESULTS

It is well established that chronic wounds have varying concentrations of wound proteases present in the wound bed, and that proteases concentrations directly correlate to wound chronicity. Wounds with relatively high proteases (RED, below) showed a reduction on the amount of residual ECM present in the wound at Days 3 and 7, as the wound proteases digested the natural ECM scaffold. The absence of residual ECM indicates to apply more ECM to the wound to further modulate proteases and move the wound out of the inflammatory phase. In wounds with less proteases, (GREEN, below), the amount of residual ECM present in the wound bed was pronounced. The amount of residual ECM was also time dependant, with more typically seen at Days 3 relative to day 7. This reflects the time dependence of proteolysis of the ECM. The following results demonstrate that ECM can be used a surrogate marker to indicate the relative levels of wound proteases.

