# Using Endoform as a Protease Indicator to Standardize Wound Management

Simone V. Morissette (MSN, NP-C, WCC), CareMore Health Systems, Cerritos, California

Every wound is different. To achieve the best healing outcome, an individually tailored approach to care is best. Even the same wound can change over time, requiring modification of the wound management strategy over the course of care. This varied and dynamic nature of wounds and particularly chronic wounds makes for a difficult learning curve when training staff on best wound care practices. In my role as Program Manager for a large health care organization, it is critically important that wound care practitioners are adequately trained to perform best-practice wound care for every patient, on every wound, and at every visit.

Endoform (Aroa Biosurgery, Auckland, New Zealand) is an extracellular matrix (ECM) with the composition and function of native tissue ECM.[1,2] Endoform modulates protease activity,[3] facilitating resolution of the stalled inflammatory phase characteristic of chronic wounds and progression to the proliferative phase where Endoform provides a scaffold for healing tissue. An antimicrobial variant of Endoform is also available that contains ionic silver and provides broad-spectrum antimicrobial activity. This makes it ideal for wounds at risk of infection.[4]

We recently performed a study evaluating the use of Endoform as a surrogate marker of wound protease levels[5,6] that showed Endoform could be used as a visual cue to identify highly proteolytic wounds and monitor wound protease levels throughout the period of care. This approach can provide useful information to tailor care to the wound simply by observing the presence of Endoform in wound bed at dressing change and determining the amount of product reapplication required (see Figure 1 and Figure 2).

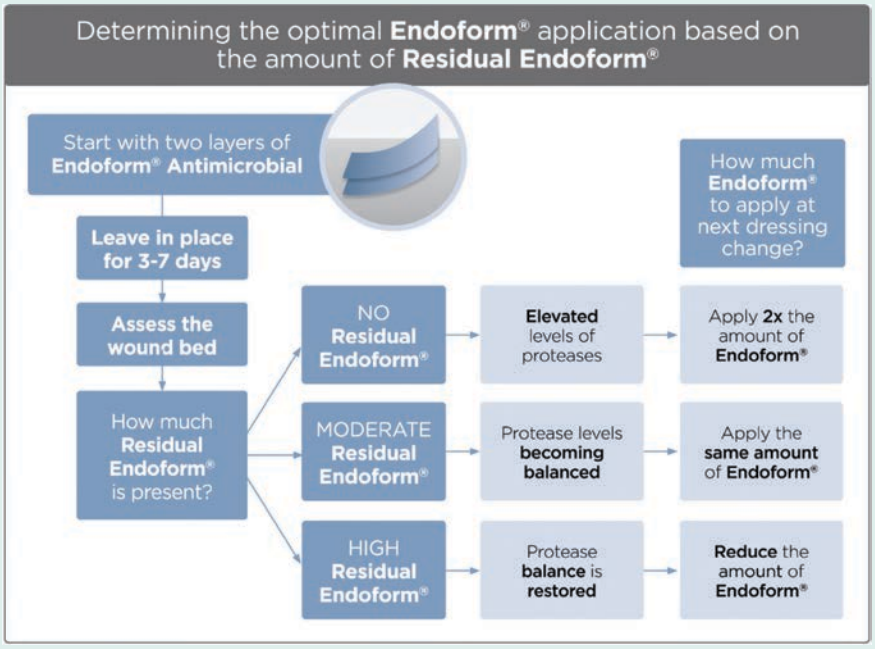


**FIGURE 1.** Protocol for determining the optimal Endoform application based on the amount of residual product.

Wounds should be assessed as follows:

- If no Endoform is present, the wound is highly proteolytic and requires increased application of Endoform (multiple layers) to control excessive protease activity.
- If minor remnants of Endoform are present, the wound is still in an inflammatory phase with elevated protease activity. Reapplication of Endoform is required to correct the protease imbalance.
- If substantial residual Endoform is present, protease levels are lower and the wound is transitioning to the proliferation phase. Reapplication should be continued at a reduced rate to scaffold granulation tissue until wound closure is achieved.

We have implemented this unique feature of Endoform in our approach to best-practice wound management. Applying the optimal amount of Endoform at each visit is a cost-effective way to achieve better healing outcomes, allow wound proteases to be quickly controlled, decrease time to closure, and minimize unnecessary applications. By dynamically tailoring the care approach to the wound, consistent results are achieved and patient

Wound Care in the First Person is made possible through the support of Aroa Biosurgery Limited and Appulse (www.appulsemed.com). The opinions and statements of the clinicians providing Wound Care in the First Person are specific to the respective authors and not necessarily those of Appulse, *Wound Management & Prevention*, or HMP. This article was not subject to the *Wound Management & Prevention* peer-review process.

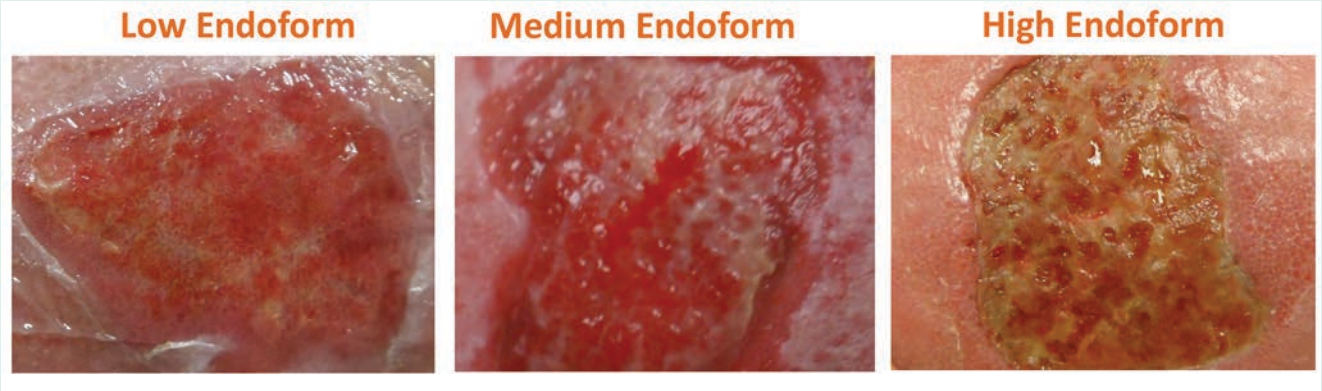


**FIGURE 2.** Visual assessment of Endoform consumption in the wound.

outcomes are improved.

Additionally, we have found in our practice that this simple algorithm is easy to teach to and implement. We have adapted our wound care staff training to include this protease indication and Endoform application algorithm. From a trainer's perspective, it is easy to teach how to determine the optimal amount of Endoform to apply. All that is required is a record of how much was applied at the last visit and the observation for any residual Endoform in the wound bed. I now teach staff to utilize this approach with each patient visit to standardize care and optimize the use of Endoform. ■

## REFERENCES

1. Lun S, Irvine SM, Johnson KD, et al. A functional extracellular matrix biomaterial derived from ovine forestomach. *Biomaterials.* 2010;31(16):4517–4529.
2. Dempsey S, Miller CH, Hill RC, Hansen KC, May BCH. Functional insights from the proteomic inventory of ovine forestomach matrix. *J Proteome Res.* 2019;18(4):1657–1668.
3. Negron L, Lun S, May BCH. Ovine forestomach matrix biomaterial is a broad spectrum inhibitor of matrix metalloproteinases and neutrophil elastase. *Int Wound J.* 2014;11(4):392–397.
4. Karnik T, Dempsey SG, Jerram MJ, et al. Ionic silver functionalized ovine forestomach matrix — a non-cytotoxic antimicrobial biomaterial for tissue regeneration applications. *Biomater Res.* 2019;23(1):6.
5. Champion S, Bohn G. Dressing Appearance at Change Can Give Insight into Dressing Effectiveness in the Wound. Presentation at the Clinical Symposium on Advances in Skin & Wound Care. September 18–21, 2015. New Orleans, LA.
6. Morrisette S, Casilang R, Bohn GA. Extracellular Matrix Technology for Assessing Wound Protease Concentrations. Presentation at the Symposium on Advanced Wound Care Spring/Wound Healing Society meeting. May 7-11, 2019. San Antonio, TX.