

Rebalancing the Wound Environment using a Collagen/ORC/Silver Dressing



Molly Gibson, Rachael Coulson, Breda Cullen, Systagenix, Gargrave, UK

ABSTRACT

Aim: To assess the ability of a collagen/oxidised regenerated cellulose (ORC)/silver dressing to reduce inflammatory proteases *in vitro*.
Introduction: It is widely accepted that chronic wounds are typically 'stuck' in the inflammatory state and produce excessive levels of inflammatory proteases. The presence of these inflammatory proteases creates a hostile environment that is detrimental to wound healing. Therefore, many therapies are used in an attempt to rebalance the wound environment.

Method: Biopsies of collagen/ORC/silver, collagen-only, silver-only or NOSF dressings were incubated at 37°C in an inflammatory protease solution. Using fluorometric assays, neutrophil-derived elastase and matrix metallo proteases (MMPs) activity was measured over time to determine the ability of each dressing to reduce inflammatory protease activity.

Results: Results indicate differences between each dressing-type in their ability to reduce the level of inflammatory proteases, specifically neutrophil-derived elastase and MMPs. The collagen/ORC/silver dressing was more effective at reducing the level of inflammatory proteases than all other dressings tested. This was primarily due to the presence of oxidized regenerated cellulose (ORC) which provides unique functionality that cannot be achieved with either silver or collagen alone.

Conclusions: This study supports previous clinical studies in that the unique combination of collagen/ORC/silver is effective at reducing inflammatory protease activity. A reduction in inflammatory protease activity will help rebalance the biochemical environment of the wound and facilitate healing. The present study also demonstrated our ability to assess protease activity using novel *in vitro* test systems.

CONCLUSIONS

The results show that **Collagen/ORC/Silver** has properties which are beneficial to wound healing

The unique combination of **Collagen/ORC/Silver** provides the greatest reduction of inflammatory protease activity – with less than 10% activity remaining after only 2 hours

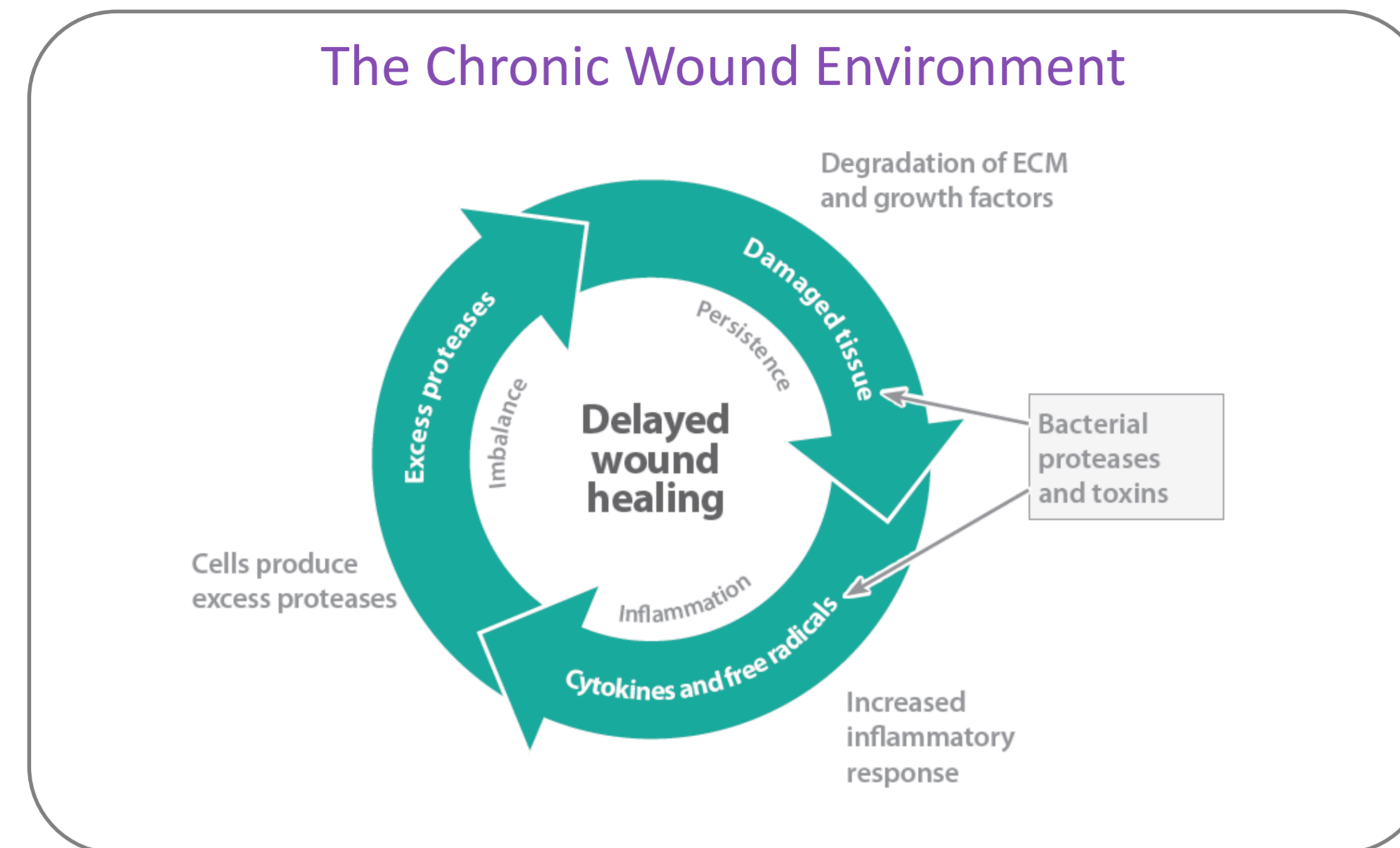
Other collagen only dressings, collagen-silver dressings and NOSF dressings have a limited ability to reduce the level of inflammatory proteases with more than 50% activity remaining after 24 hours

Reducing inflammatory protease activities helps rebalance the biochemical environment of the wound, thereby aiding healing

PROMOGRAN® and **PROMOGRAN PRISMA®** are the only Collagen/ORC dressings available

OBJECTIVES

- To demonstrate the ability of **Collagen/ORC/Silver** to rebalance the wound environment
- To assess the ability of **Collagen/ORC/Silver** & other Collagen/Silver products and NOSF dressings to reduce inflammatory proteases

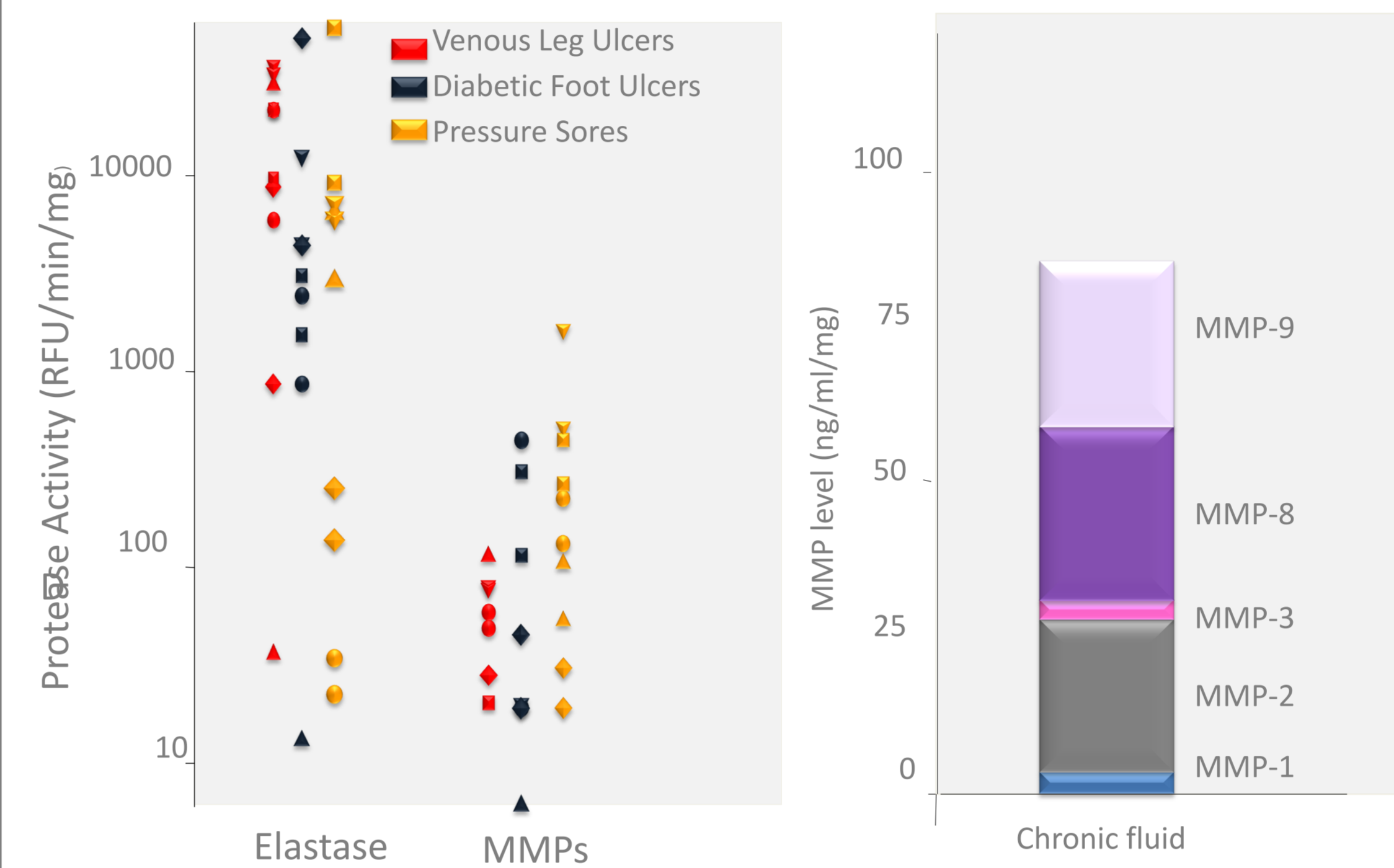


Inflammatory Proteases – Measurement Methods

The effect of Collagen/ORC/Silver compared to other products on protease levels was evaluated using protease activity assays. Clinically relevant levels of proteases were used in the assay. Peptide substrates with a fluorescent reporter groups was used for the activity assays in combination with an appropriate buffer system. Neutrophil-derived elastase measured using a specific substrate and buffer system 0.1M HEPES, pH 7.5, 0.5M NaCl, 10% DMSO. MMP levels were measured using ELISA based activity assays (R&D Systems/Anaspec)

Inflammatory Proteases Elevated in Chronic Wounds

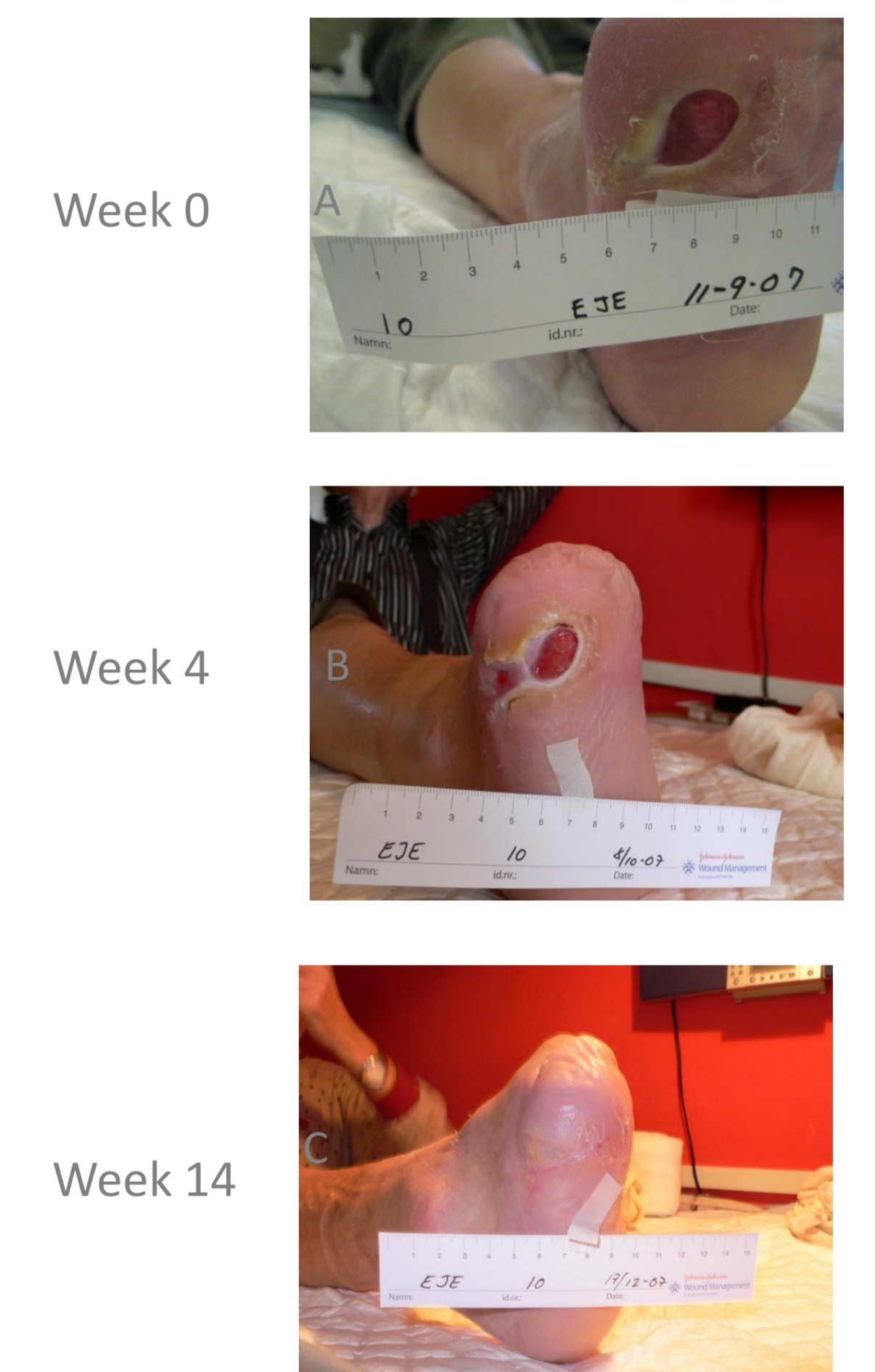
Published: Cullen, B. et al., (2002) Wound Rep Reg. 10: 16-25



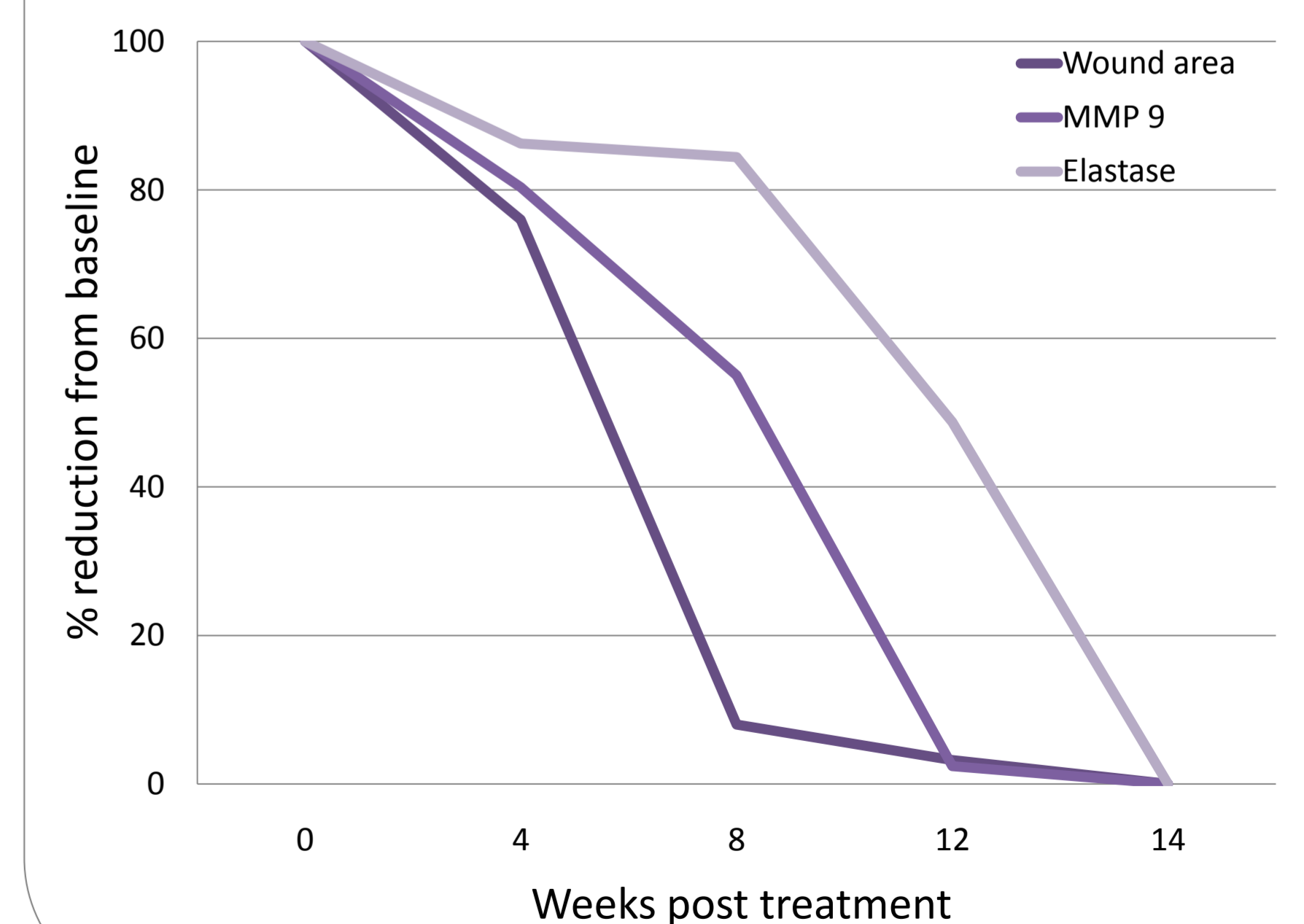
- This study demonstrates inflammatory proteases predominate
- Elastase is the predominate protease in chronic wound fluid
 - MMPs were also found to be in excess in chronic wound fluid
 - MMP-2, MMP-8 & MMP-9 are the main MMPs present in wound fluid

Effect in Patients

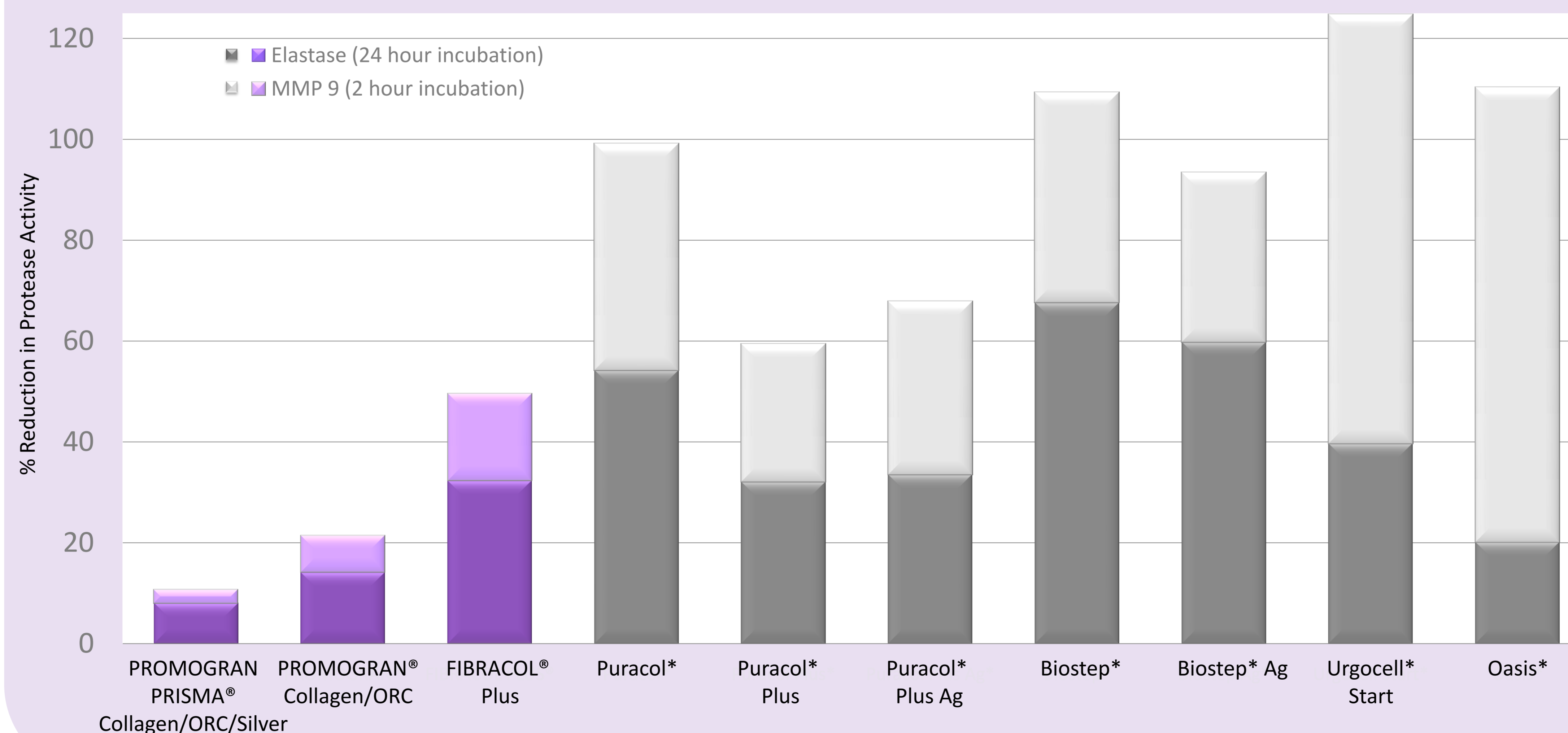
A 74 year old male with type 2 diabetes presented with a diabetic foot ulcer on the right foot. The patient had previously undergone transmetatarsal amputation on this foot. At baseline the duration of the wound was 7 months with an area of 2.5 cm² and a maximum depth of 0.4 cm.



The percentage reduction in wound size, MMP 9 activity and Elastase activity compared to baseline values.



Collagen/ORC/Silver Provides Unsurpassed Reduction in Inflammatory Protease Activity



* This product is a trademark of its owner

