THE EFFECT OF COLLAGEN-CONTAINING DRESSINGS ON THE PROTEOLYTIC ENVIRONMENT OF THE CHRONIC WOUND

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Aim: To determine the ability of collagen-containing dressings to modulate proteases present in the chronic wound environment, and compare the effects of collagen/ORC over collagen alone.

Methods: In this study we have collected and characterised chronic wound fluid to determine which proteases are elevated and which are predominant in the pathophysiology of chronic wounds. Using an ex vivo wound fluid model we then evaluated the ability of Collagen/ORC (+/- silver) and other collagen-containing (+/- silver) dressings to inactivate these proteases over time. Protease activity was measured using fluorimetric substrates which are cleaved in the presence of a specific protease.

Results: Our results corroborate previous studies showing that proteases are elevated in chronic wounds, however in addition we report that neutrophil-derived elastase is the predominant protease, followed by excessive levels of MMP 2, 8 & 9. It is the combined action of these proteases that leads to the degradation of all components of the dermis and helps create the destructive environment of the chronic wound. When we compared collagen/ORC (+ silver) with other collagen(+ silver) dressings we found that collagen/ORC significantly reduces all proteases and is effective against both elastase and MMPs. Other collagen-containing dressings demonstrated varying abilities to reduce MMP-type proteases, and in general were poor at reducing elastase activity.

Discussion: This study shows that it is necessary to reduce both elastase and MMP-type proteases in order to rebalance the chronic wound environment. Our comparative studies have demonstrated that the combination of collagen & ORC offers additional benefits over collagen alone, in its ability to restore the proteolytic imbalance of a chronic wound and provide an optimal environment for healing.