

# Proteinase Modulation by an Activated Carbon Cloth

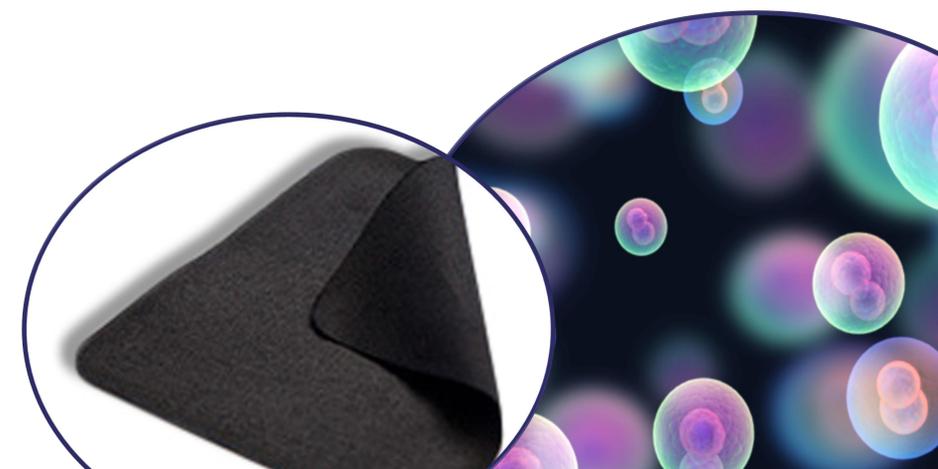
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## Introduction

Matrix metalloproteinases (MMPs) play important roles in wound healing but when in excess, their presence leads to prolonged inflammation and delayed wound healing. The aim of this study was to demonstrate the MMP sequestration potential of an activated carbon cloth<sup>1</sup> (ACC) and to compare it to other market-leading products.

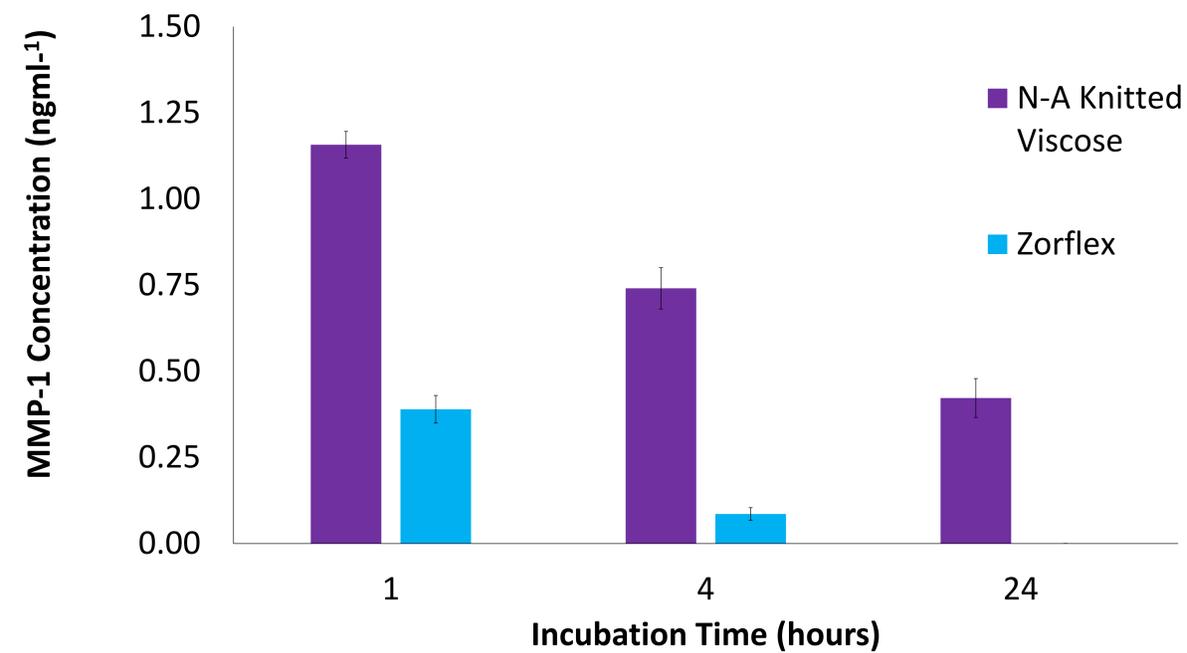
## Method

Dressing samples were incubated with proteinase solutions for 1, 4 and 24 hours at 37°C. Following incubation, the concentration of remaining proteinase was determined by ELISA. All samples were tested in triplicate. A gauze dressing was included as a negative control. Additionally, the ACC was compared to known proteinase modulating dressings in terms of MMP-2 and MMP-9 sequestration after 24 hours.

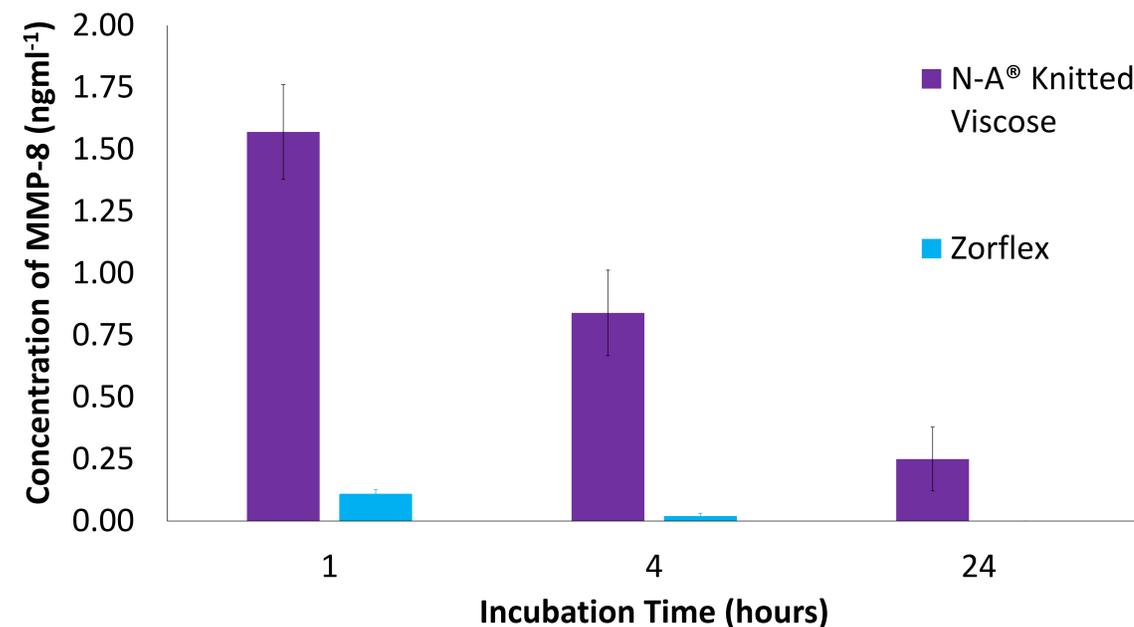


# Results

The concentration of MMP-1 and MMP-8 remaining in ACC treated supernatants was significantly lower than control dressing samples at all time points and was undetectable in ACC treated supernatants after 24 hours (Figure 1 and Figure 2).



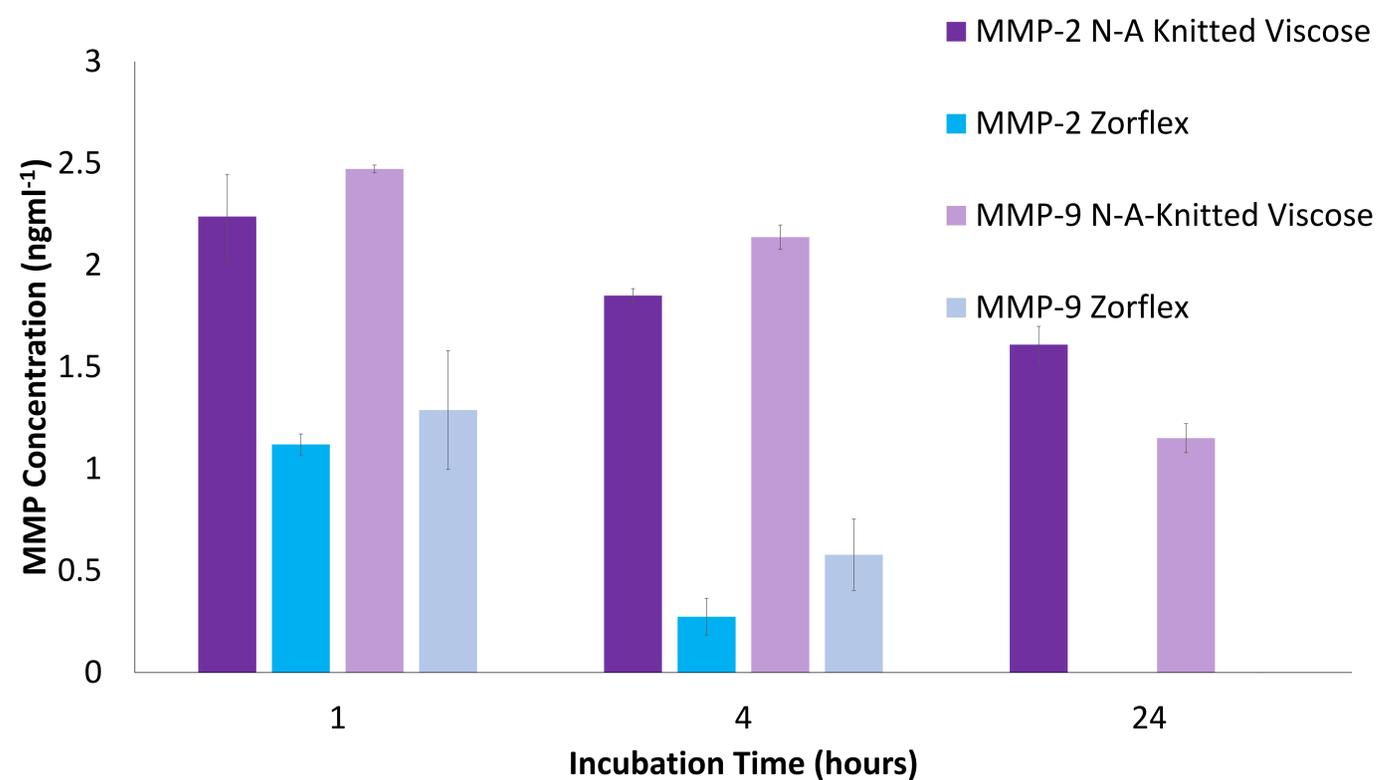
**Figure 1.** Concentration of MMP-1 remaining in supernatant following 1, 4 and 24 hours incubation with test dressings.



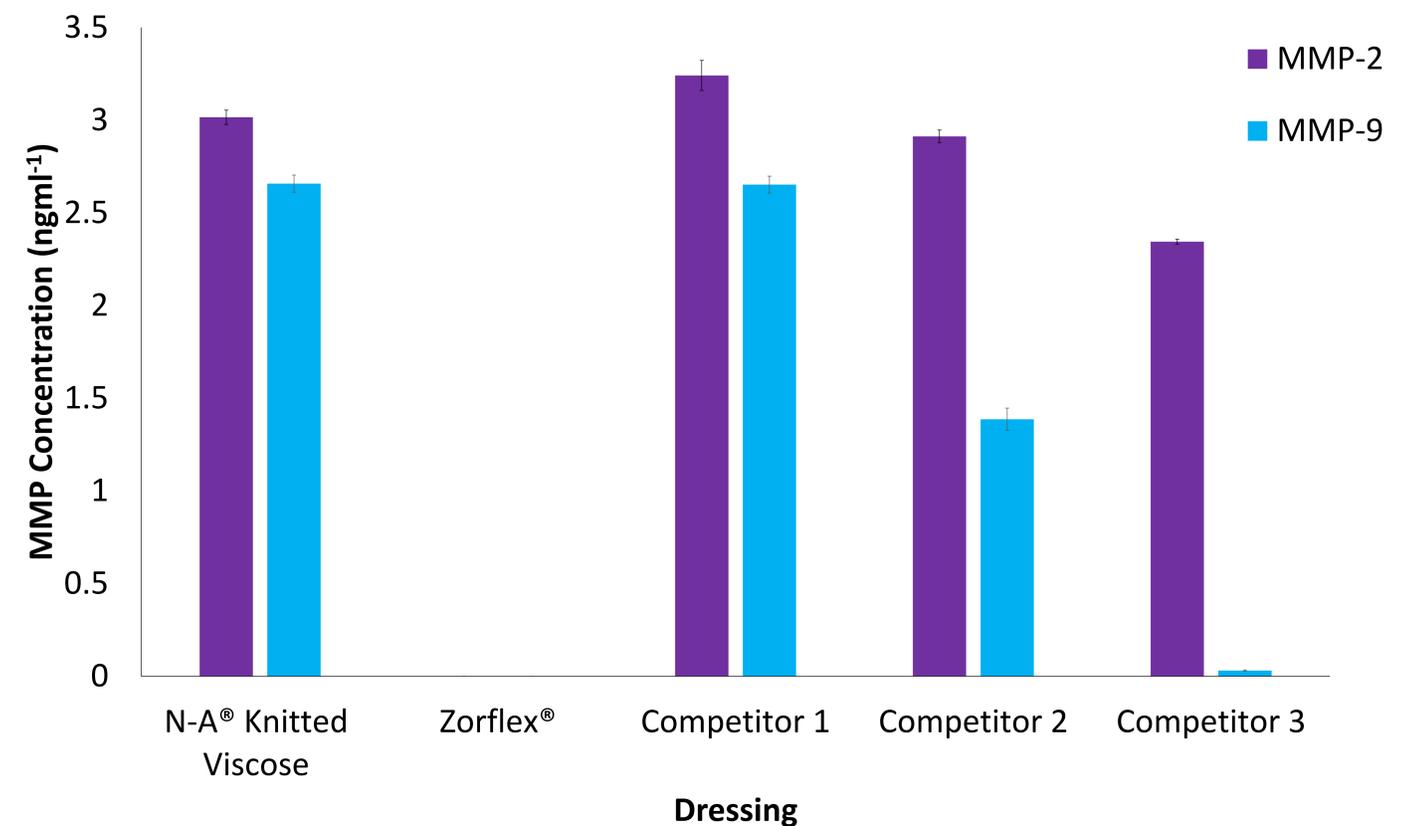
**Figure 2.** Concentration of MMP-8 remaining in supernatant following 1, 4 and 24 hours incubation with test dressings.

# Results

The concentration of MMP-2 and MMP-9 remaining in ACC treated supernatants was significantly lower than control dressing samples at all time points and was undetectable in ACC treated supernatants after 24 hours (Figure 3). The ACC sequestered significantly more MMP-2 and MMP-9 than known protease modulating dressings following 24 hours incubation (Figure 4).



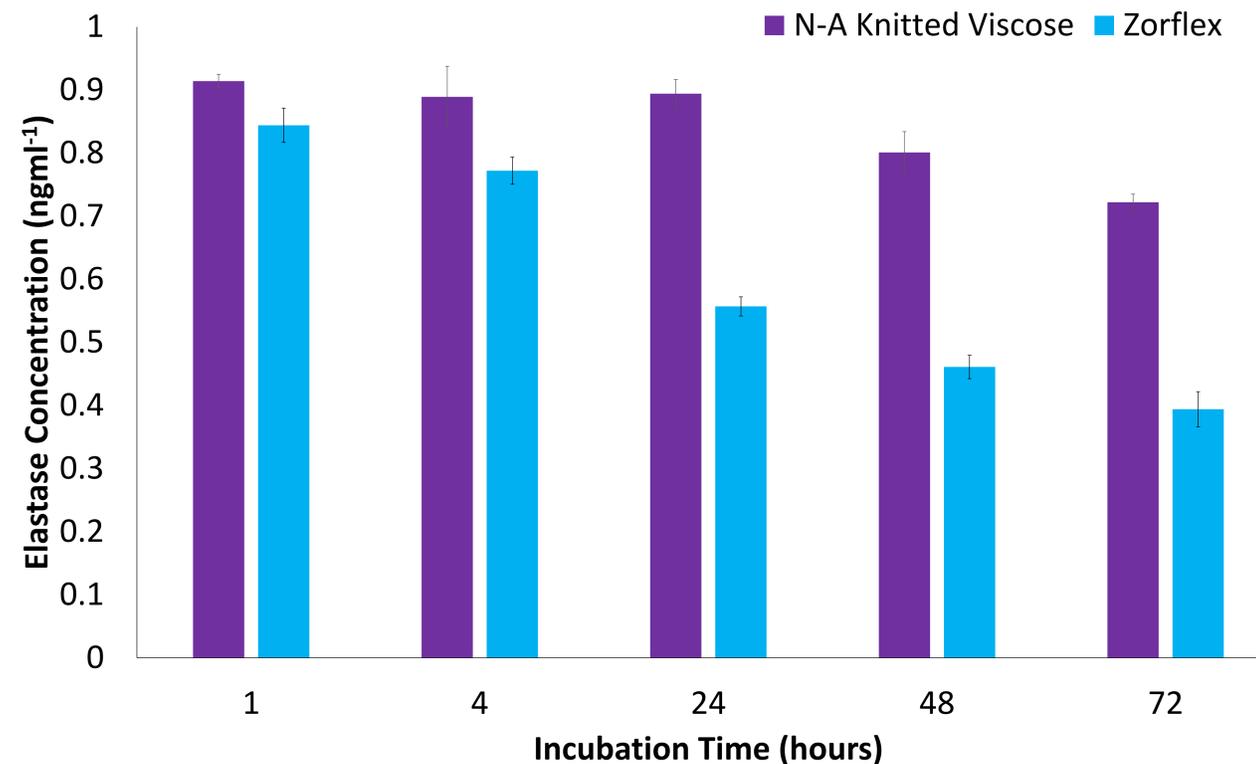
**Figure 3.** Concentration of MMP-2 and MMP-9 remaining in supernatant following 1, 4 and 24 hours incubation with test dressings.



**Figure 4.** Concentration of MMP-2 and MMP-9 remaining in supernatant following 1, 4 and 24 hours incubation with a range of test dressings.

# Results

Following 24 hours incubation, the concentration of elastase recovered from the ACC supernatant was significantly lower than the concentration recovered from the control dressing ( $P < 0.05$ ) (Figure 5).



**Figure 5.** Concentration of Human Elastase remaining in supernatant following 1, 4 and 24 hours incubation with test dressings.

# Conclusions

Elevated levels of protease within a chronic wound can delay wound healing. This data suggests that application of the ACC could reduce elevated protease levels which could be beneficial to wound healing. Clinical studies are required to confirm these observations.