

A Comparison of the Performance of Silver containing Wound Dressings

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Abstract

Aims

To evaluate *in vitro* the potential for adherence of a number of fibrous (mainly alginate) wound dressings, and a novel Non-adherent Antimicrobial Silver Alginate Wound Dressing. To verify Non-Adherent Antimicrobial Silver Alginate Wound Dressing suitability in the management of moderate to highly exuding wounds.

Methods

A unique quantitative *in-vitro* model has been developed, based upon the adherence of a wound dressing to a fibrin clot. The clot provides an adherent, biological matrix simulating the wound bed surface and is applied between two pieces of dressing and the grams force (gf) required to remove the dressing from a fibrin clot is measured.

Additionally, a number of tests have assessed a variety of dressing properties, namely, 1) absorbency, by BP method 2) wet tensile strength, by Instron measured in Newtons (N), 3) availability of silver released from the wound dressing into simulated wound fluid, re-challenged daily for 7 days and 4) antimicrobial activity using zone of inhibition and Log₁₀ reduction assays against common chronic wound pathogens.

Results

The maximum amount of gf required to separate the dressing material from the fibrin clot was found to be significantly lower for the Non-Adherent Antimicrobial Silver Alginate Dressing (<160gf) compared with a hydrofibre dressing (~310gf), alginate dressing (688gf) or alginate/combination dressing (384gf).

The Non-Adherent Antimicrobial Silver Alginate Dressing has superior wet tensile strength compared to the other dressings evaluated and was either comparable with or superior to the other dressings evaluated for absorbency, silver release and antimicrobial efficacy.

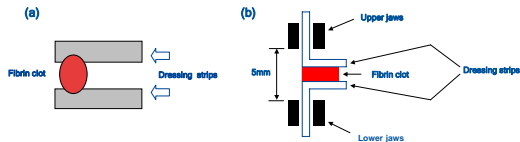
Conclusion

Reduced adherence of dressings to the wound surface may positively influence the wound healing process. This novel Non-Adherent Antimicrobial Silver Alginate Dressing combines existing alginate/CMC properties suitable in the effective management of moderate to highly exuding wounds with the unique benefits of a non-adherent wound contact layer.

Methods

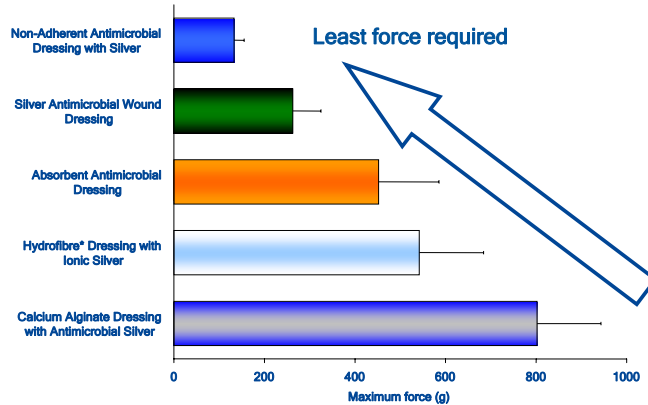
- **Absorbency**, absorbent capacity, BP 1993, Addendum (1995) For Alginate Dressings.
- **Silver release**, silver levels measured by Atomic Absorption (AA) Spectroscopy.
- **Wet Tensile Strength**, force required to separate dressings using Instron tensile tester.
- **Antimicrobial activity**
- **Zone of inhibition test**, dressing applied to bacterial lawn. Zone of inhibition measured.
- **Log₁₀ reduction test**, dressings in a quantified suspension of bacteria. Ability to reduce number.
- ***In vitro* adherence model**

Sandwich a fibrin clot between two pieces of dressing material (a). Incubate for 24 hours at 37°C. Measure the force required to separate the dressing from the clot using the Instron tensile tester (b).



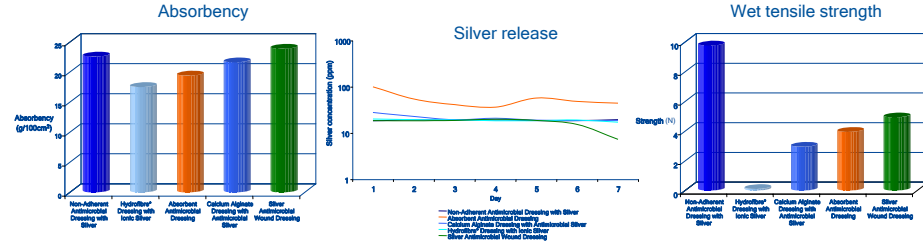
Objectives

- Measure the potential adherence of wound dressings *In vitro*
- Verify the suitability of a Non-Adherent Antimicrobial Silver Alginate wound dressing for use on moderately to highly exuding chronic wounds



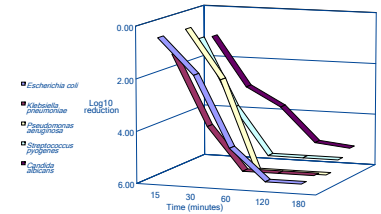
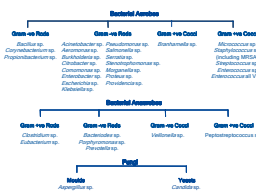
The data presented is the average force required to separate the dressing material from a fibrin clot. For each dressing tested, shown from top to bottom on the graph, the average result was 132g, 452g, 542g and 802g, respectively.

Physical Performance Attribute Comparison



Efficacy of an Antimicrobial Silver Dressing with a Non-Adherent Layer

Broad spectrum antimicrobial activity
Zones of inhibition present against micro-organisms listed



Conclusion

The Non-Adherent Antimicrobial Dressing with Silver was comparable with or superior to other commercially available dressings indicated for use on similar wound types for absorbency and wet tensile strength.

Maintaining the existing alginate/carboxymethylcellulose properties of the dressing material ensures its suitability for use on moderately to highly exuding wounds.

The Antimicrobial Dressing with Silver with its unique, non-adherent wound contact layer, showed the least potential for adherence, *in vitro*.