AQUACEL® Ag+ Dressings

YOU HAVE THE POWER TO **DISRUPT AND DESTROY BIOFILM** TO ADVANCE HEALING

Hydrofiber® TECHNOLOGY

MORE THAN SILVER™

ConvaTec

Chronic wounds are a battle worth fighting

Estimated to affect 1% of the general population in the developed world[1], chronic wounds are expected to increase due to ageing populations and obesity.[2,3]

£7,600 and £7,800
The estimated respective mean NHS costs per annum to manage a venous leg ulcer and a diabetic foot ulcer. For those unhealed wounds, these estimates increase to £13,500 and £8,800 respectively (rising to £16,900 for diabetic foot amputations). [4, 5]

Antibiotic overuse
High rates of antibiotic prescribing (60%-75%) are reported in patients with chronic, non-healing wounds,[6,7] and there are concerns regarding overuse.[8]

Cost of infected wounds
The cost per patient of a diabetic foot ulcer was **4x higher** in those that were infected, with costs largely attributed to antibiotics, amputations and hospitalisation.[9]

BIOFILM IS PRESENT IN AT LEAST 78% OF CHRONIC WOUNDS[10]

75% OF NON-HEALING WOUNDS HAD CONFIRMED BIOFILM[11]

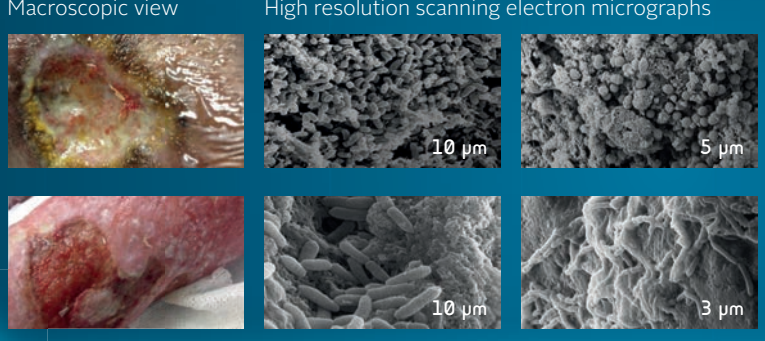
Biofilm is an enemy worth targeting

In the battle to heal chronic wounds, there is an invisible enemy. Biofilm is a primary cause of chronic infection,[12] blocking the effective action of antibiotic and antiseptic agents.[13]

Biofilm is everywhere
In healthcare, biofilm accounts for more than 80% of all microbial infections.[14] In nature, 99% of bacteria exist in biofilm.[15]

Difficult to eradicate
Biofilm is difficult to completely remove, even with debridement. It reforms quickly[16] and is a precursor to infection.[13] It is tolerant to antiseptics and antibiotics and able to evade the body's immune response.[13, 17]

Delays wound healing[18,19]
Biofilm creates a sustained but ineffective inflammatory response.[20] It also impairs granulation, tissue formation and epithelialisation.[20]

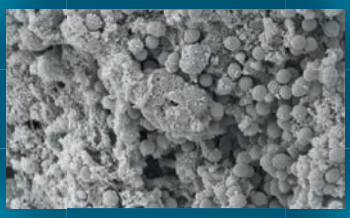


A real-life evaluation of stalled wounds[11] confirmed the meta-analysis[10] results of biofilm prevalence:

- 16 stalled wounds were selected where a primary cause of non-healing was attributed to the presence of biofilm.
- Biopsy and subsequent microscopic analysis confirmed the presence of biofilm in 75% of the wounds.

Know your enemy

Biofilm can be defined as microbial cells adherent to a living or non-living surface, which are embedded within a self-produced matrix of extra-cellular polymeric substances (EPS). Biofilm provides tolerance to antimicrobial agents and can result in persistent inflammation and infection.[20, 21]



Biofilm image obtained with high resolution scanning microscope[11]

How biofilm operates within the wound

DEFENCE MODE

EPS shields micro-organisms from antibiotics, antiseptics and the host's immune response.[22]

This biofilm-specific defence and the inability to breach the EPS matrix contributes to a chronic inflammatory state in the wound environment.[21]

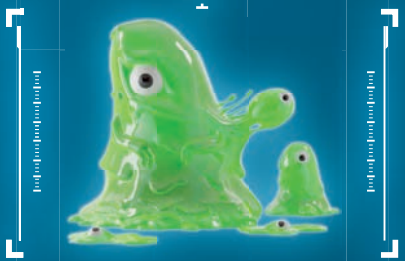
Extra-cellular polymeric substance (EPS)

This is the self-produced protective matrix that surrounds bacteria. Largely water, plus sugars, proteins, glycolipids and bacterial DNA, it is one of the defence mechanisms of mature biofilm.[21]

RECOVERY MODE

Biofilm is difficult to remove completely as it is attached to the wound bed. Biofilm can reform in as little as 24h, even following aggressive debridement.[16]

To prevent biofilm reformation, effective long-lasting antimicrobial protection is needed.[16]



ATTACK MODE

Biofilm can spread and form new colonies by constantly releasing micro-organisms from the mature biofilm structure.[22]

This can increase the risk of cross-infection both within the wound and in the surrounding environment.[23]

MORE THAN SILVER™

Disrupt and destroy biofilm with our breakthrough technology

Specifically developed to win the battle against biofilm, MORE THAN SILVER™ technology contains three components; ionic silver together with a surfactant and metal chelating agent, which work together to deliver superior*[24] anti-biofilm performance.

In their 2014 guidelines on the diagnosis and management of biofilm infections,[25] the European Society for Clinical Microbiology and Infectious Diseases recognised biofilm as a principle cause of chronic wound infection.

Additionally the society expressed an urgent need for research to improve prevention and treatment of biofilm infections, including research into chelator agents and their ability to make the biofilm more amenable to management.[25]

The result of years of research

Developing MORE THAN SILVER™ technology involved researching a wide range of biofilm-disrupting agents and surfactants in combination with antimicrobials.[24]

250,000
POTENTIAL COMBINATIONS WERE IDENTIFIED

60,000
WERE TESTED

United in the battle against biofilm

Biofilm is more likely to develop if exudate management is poor.[26] Hydrofiber® technology works together with MORE THAN SILVER™ technology to absorb and remove wound exudate and disrupted EPS and bacteria, helping to manage wound moisture and support healing.[27]

Hydrofiber® TECHNOLOGY + MORE THAN SILVER™ = AQUACEL® Ag+ Dressings

* When compared to AQUACEL® Ag+ Extra™ dressing and other silver-only competitor dressings: ACTICOAT™ 7 and SILVERCEL™ Non-Adherent dressings.

1. BEC: A SURFACTANT

Surfactants help to dissolve and remove contamination from surfaces by lowering the surface tension and can be found in products such as skin wipes. MORE THAN SILVER™ technology incorporates BEC (Benzethonium chloride).

BEC reduces the surface tension within a biofilm to enhance the ability of EDTA to remove metal ions in biofilm. BEC and EDTA synergistically work together to disrupt biofilm structures aiding the absorption and removal of the EPS and micro-organisms by the dressing.[28-32]

2. EDTA: METAL CHELATING AGENT

Chelating agents are compounds that strongly attract and bind certain metal ions, boosting the action of surfactants. MORE THAN SILVER™ technology incorporates EDTA (ethylenediaminetetraacetic acid disodium salt).

EDTA helps disrupt biofilm by removing metal ions that hold the EPS matrix together to expose micro-organisms to the antimicrobial effects of the ionic silver.[28-31]

DISRUPTS

DISRUPTS

DESTROYS

3. IONIC SILVER

A broad-spectrum antimicrobial.

Silver is a safe, broad-spectrum antimicrobial that is only effective in its ionic form. Attracted to sites on bacterial cell walls, it accumulates and then enters the cell, where it damages the DNA, denatures proteins and enzymes, and interferes with protein synthesis. The cell wall becomes porous and the contents leak out, leading to cell death.[33,34]

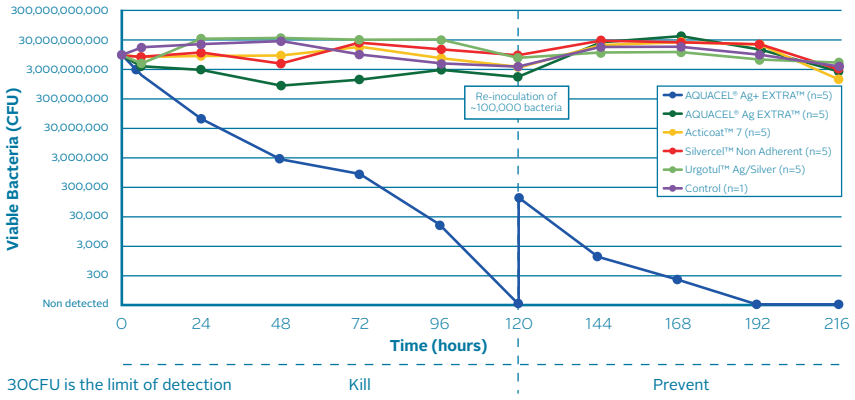
Winning the battle to **disrupt, destroy and prevent reformation of biofilm**

MORE THAN SILVER™ technology in AQUACEL® Ag+ dressings enables superior and sustained anti-biofilm activity against antibiotic-resistant biofilm and prevents reformation of biofilm

Test
Community-acquired Methicillin-Resistant *Staphylococcus aureus* (CA-MRSA) *in vitro* wound biofilm model.[35]

Objective
To establish the antimicrobial activity of AQUACEL® Ag+ Extra™ and other silver-based dressings against antibiotic-resistant micro-organisms in terms of:
- Ability to disrupt the biofilm and kill the micro-organisms.
- Prevent biofilm re-growth following re-inoculation.

Results
AQUACEL® Ag+ Extra™ demonstrated:
- Faster kill-rate against CA-MRSA.
- Reduced biofilm levels within 6 hours of dressing application.
- Sustained activity after re-inoculation at day 5 to prevent biofilm regrowth.



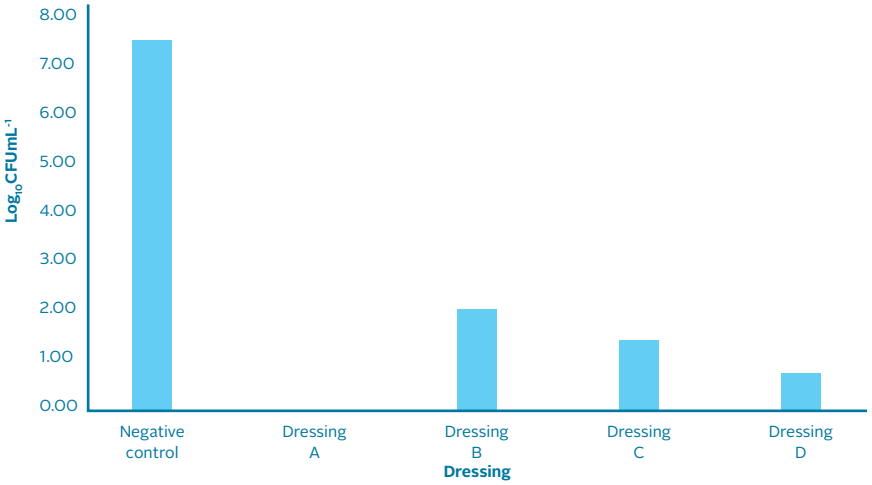
Antimicrobial activity of AQUACEL® Ag+ Extra™, AQUACEL® Ag Extra™, Acticoat™ 7, Silvercel™ Non Adherent and Urgotul™ Ag/Silver dressings against CA-MRSA; illustration of kill and prevention of regrowth over 9 days.

MORE THAN SILVER™ technology in AQUACEL® Ag+ dressings delivers superior anti-biofilm activity compared to other silver dressings

Test
To mimic wound conditions, a challenging, multi-species in *vitro* biofilm model was developed based on an UKAS-accredited CDC (Centres for Disease Control and Prevention) reactor model. The CDC reactor was incubated for 72 hours using a suspension containing *Staphylococcus aureus, Pseudomonas. aeruginosa and Candida albicans*. Dressings were applied for 24 hours.[36]

Objective
To compare the anti-biofilm activity of AQUACEL® Ag+ Extra™ dressing with a range of silver-only gelling fibre dressings.

Results
Only AQUACEL® Ag+ Extra™ dressing reduced viable micro-organisms to undetectable levels after 24 hours of exposure.



Quantity of total viable micro-organisms recovered following 24-hour dressing exposure to a 72-hour pre-formed multi-species biofilm.

Dressing: A = AQUACEL® Ag+ Extra™, B = UrgoClean™ Ag, C = Exufiber™ Ag+, D = Kerracel™ Ag

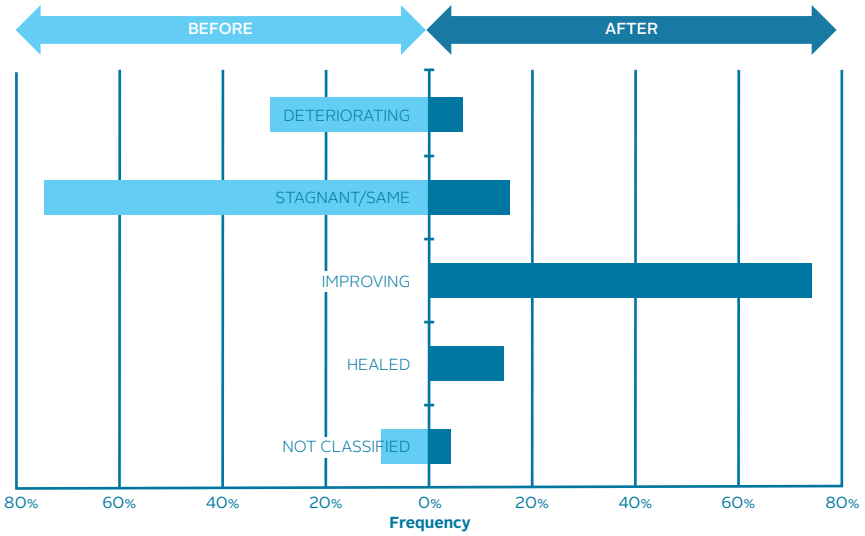
Winning the battle to **advance healing**

AQUACEL® Ag+ dressings advance healing in stalled, deteriorating chronic wounds

Test
111 patients, with challenging and stalled wounds from 60 centres across the UK and Ireland.[37]

Objective
To demonstrate the ability of AQUACEL® Ag+ dressings to promote healing in chronic wounds that were stalled or deteriorating at baseline.

Results
- 78% of wounds progressed towards healing, 13% healed completely during an average evaluation period of 3.9 weeks.
- 83% of the wounds progressed in key wound healing parameters (exudate, suspected biofilm and wound healing status).
- Biofilm was suspected more frequently (54%) than any other clinical sign of infection at baseline. This reduced to 27% at the final evaluation.



Wound status at baseline (light blue) and after evaluation (dark blue).

Case studies: Advancing healing in chronic wounds

Example 1 - the wound:
Diabetic foot ulcer (6+ months) with the following clinical signs: Odour, exudate, slough, suspected biofilm.

Results
AQUACEL® Ag+ dressings: peri-wound skin improved, wound bed improved, healed in 5 weeks.

On presentation | 10 days | 37 days

Example 2 - the wound:
Stalled foot ulcer (3 months) with the following clinical signs: antibiotics, and standard silver dressing had failed.

Results
AQUACEL® Ag+ dressings: change from sloughy to granulation tissue. Ulcer healed in less than 7 weeks.

On presentation | 15 days | 45 days

Images kindly provided by Vitor Santos, Centro de Tratamento de Feridas São Peregrino – Med Caldas

Don’t delay: make biofilm your target with **AQUACEL® Ag+ dressings**

Why wait for a wound to get worse?

If you’re faced with delayed healing, it’s time to target the enemy. With AQUACEL® Ag+ dressings, you have the power to disrupt and destroy biofilm to advance healing.

Perfect allies

AQUACEL® Ag+ dressings can be used on a wide range of acute and chronic wound types and partner perfectly with AQUACEL® Foam dressings.

AQUACEL® Ag+ Extra™

Dressing Size	Pack size	Product Code	NHS Code	PIP Code
AQUACEL® Ag+ Extra™ Dressings				
5cm x 5cm	10	413566	ELY514	386-2703
10cm x 10cm	10	413567	ELY515	386-2695
15cm x 15cm	5	413568	ELY516	386-2711
20cm x 30cm	5	413569	ELY517	386-2679
4cm x 10cm	10	413581	ELY520	386-0350
4cm x 20cm	10	413598	ELY521	386-0368
4cm x 30cm	10	413599	ELY522	386-2687

AQUACEL® Ag+ Ribbon

Dressing Size	Pack size	Product Code	NHS Code	PIP Code
AQUACEL® Ag+ Ribbon Dressings (for cavity wounds)				
1cm x 45cm	5	413570	ELY518	386-2729
2cm x 45cm	5	413571	ELY519	386-2737

AQUACEL® Foam

Dressing Size	Pack size	Product Code	NHS Code	PIP Code
Adhesive				
8cm x 8cm	10	420804	ELY428	378-1820
10cm x 10cm	10	420680	ELY417	370-2784
12.5cm x 12.5cm	10	420619	ELY418	370-2792
17.5cm x 17.5cm	10	420621	ELY419	370-2800
21cm x 21cm	5	420623	ELY420	370-2818
19.8cm x 14cm (Heel)	5	420625	ELY422	370-7486
20cm x 16.9cm (Sacral)	5	420626	ELY423	370-6041
24cm x 21.5cm (Sacral)	5	420828	ELY565	388-5829
8cm x 13cm	10	421149	ELY574	394-3800
10cm x 20cm	5	421150	ELY572	395-0581
10cm x 30cm	5	421154	ELY573	395-0599
25cm x 30cm	5	420624	ELY421	370-7361
Non-Adhesive				
5cm x 5cm	10	420631	ELY412	369-9311
10cm x 10cm	10	420633	ELY413	369-9329
15cm x 15cm	5	420635	ELY414	370-2750
20cm x 20cm	5	420636	ELY416	370-2776
15cm x 20cm	5	420637	ELY415	370-2768
10cm x 20cm	5	421156	ELY575	394-3818

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To learn more about AQUACEL® Ag+ or to arrange a visit from your ConvaTec representative, **please call 0800 289 738 (UK)** or **1800 946 938 (ROI)**

www.convatec.co.uk

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