

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



NON-HEALING WOUNDS NEED
MORE THAN SILVER™



+



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AQUACEL® Ag+ Dressings

2 TECHNOLOGIES, 1 SOLUTION

Biofilm is one of the major causes of delayed wound healing^{1,2}



Biofilm is present in at least 78% of chronic wounds³

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.^{4,5}



DEFENCE MODE

EPS shields micro-organisms from antibiotics, antiseptics and the host's immune response.⁵

This biofilm-specific defence and the inability to breach the EPS matrix contributes to a chronic inflammatory state in the wound environment.⁴



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.⁶

To prevent biofilm reformation, effective long-lasting antimicrobial protection is needed.⁶



ATTACK MODE

Biofilm can spread and form new colonies by constantly releasing micro-organisms from the mature biofilm structure.⁷

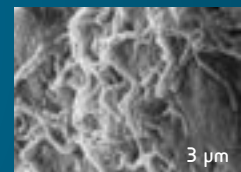
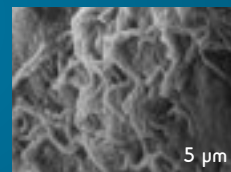
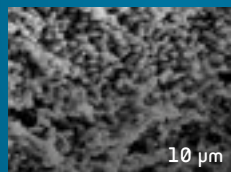
This can increase the risk of cross-infection both within the wound and in the surrounding environment.⁸

Biofilm cannot always be seen with the naked eye and sometimes even wounds that do not show clear signs of infection may contain biofilm.

Macroscopic view



High resolution scanning electron micrographs



MORE THAN SILVER™ technology designed to **disrupt and destroy** biofilm

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*⁹ anti-biofilm performance.

▶ 1. BEC[†]

BEC, a surfactant, reduces the surface tension within a biofilm to enhance the anti-biofilm performance of AQUACEL® Ag+ dressings.¹⁰⁻¹⁴

▶ 2. EDTA[‡]

A metal chelating agent, EDTA helps disrupt biofilm by removing metal ions that hold the EPS matrix together to expose microorganisms to the antimicrobial effects of the ionic silver.¹⁰⁻¹³



▶ 3. IONIC SILVER

A broad-spectrum antimicrobial contained in a safe and effective quantity (1.2%) ensures cell death of the exposed bacteria by damaging the DNA, denaturing proteins and enzymes, and interfering with protein synthesis.¹⁵⁻¹⁶

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.⁹

250,000

POTENTIAL COMBINATIONS
WERE IDENTIFIED

60,000

WERE TESTED

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

[†] Benzethonium chloride

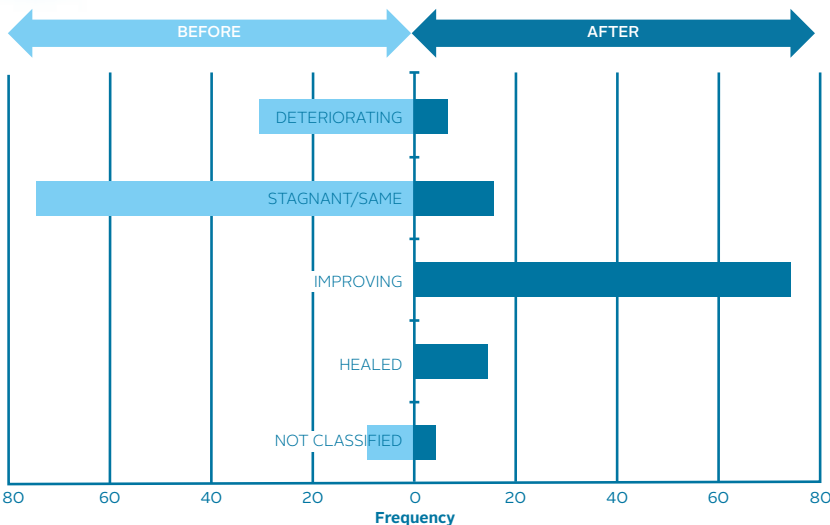
[‡] Ethylenediaminetetraacetic acid disodium salt

Winning the battle to advance healing

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

A real life evaluation of clinical cases¹⁷

111 PATIENTS ACROSS 60 CENTRES IN UK AND IRELAND
WOUND DURATION RANGING FROM 1 WEEK TO 30 YEARS



54% of wounds showed clinical signs of biofilm presence at baseline

78% of wounds healed or progressed to healing during an average evaluation period of 3.9 weeks

99% of clinicians would recommend the use of AQUACEL® Ag+ Extra™ dressings

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.

Example 2 - the wound:

Stalled foot ulcer (3 months): no improvement following antibiotic therapy and standard silver dressing.

Results

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



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

AQUACEL Ag+ Dressings

Dressing Size	Pack size	Product Code
AQUACEL® Ag+ Extra™ Dressings		
5 cm x 5 cm (2" x 2")	10	413566
10 cm x 10 cm (4" x 4")	10	413567
15 cm x 15 cm (6" x 6")	5	413568
20 cm x 30 cm (8" x 12")	5	413569

Dressing Size	Pack size	Product Code
AQUACEL® Ag+ Ribbon Dressings		
1 cm x 45 cm (approx. 0.39" x 18")	5	413570
2 cm x 45 cm (approx. 3/4" x 18")	5	413571

For more information, please call our Customer Relations Center (Registered Nurses on staff) at **1-800-465-6302**, Monday through Friday, 8:00 AM to 6:00 PM (EST), or visit our Web Site at www.convatec.ca

1. Hurlow, J, Couch, K, Laforet, K, Bolton, L, Metcalf, D. et al. (2015). Clinical Biofilms: A Challenging Frontier in Wound Care. *Advances in Wound Care*, 4(5), 295-301. 2. Metcalf, Bowler. Biofilm delays wound healing: a review of the evidence. *Burns Trauma* 2013; 1: 5-12. 3. Malone M et al. 2017. The prevalence of biofilm in chronic wounds: a systematic review and meta-analysis of published data. *JWC*; 20:25. 4. Gurjala AN et al. Development of a novel, highly quantitative in vivo model for the study of biofilm-impaired cutaneous wound healing. *Wound Rep Reg* (2011) 19:400-410. 5. Hall-Stoodley L et al. Towards diagnostic guidelines for biofilm-associated infections. *FEMS Immunol Med Microbiol*. 2012; 65:127-145. 6. Wolcott RD et al. Biofilm maturity studies indicate sharp debridement opens a time dependent therapeutic window. *J Wound Care*. 2010; 19:320-328. 7. Costerton JW, Stewart PS, Greenberg EP. Bacterial Biofilms: A Common Cause of Persistent Infections. 1999. *284 Science*. 8. Saye DE. Recurring and antimicrobial-resistant infections: Considering the potential role of biofilms in clinical practice. *Ostomy Wound Management* 2007 53:4 (46-62). 9. Bowler PG, Parsons, D. Combatting wound biofilm and recalcitrance with a novel anti-biofilm Hydrofibre® wound dressing. *Wound Medicine* 14 (2016) 6-11. 10. Said J, Walker M, Parsons D, Stapleton P, Beezer AE, Gaisford S. An in vitro test of the efficacy of an anti-biofilm wound dressing. *Int J Pharmaceutics*. 2014; 474: 177-181. DOI: 10.1016/j.ijpharm.2014.08.034. 11. Composition comprising antimicrobial metal ions and a quaternary cationic surfactant WO12136968 Parsons World patent application 11th October 2012. 12. Banin E, Brady K.M. & Greenberg E.P. (2006). Chelator Induced Dispersal and Killing of *Pseudomonas aeruginosa* Cells in Bio Im. *Appl. Environ. Microbiol.* 72. 2064-2069. 13. Chen X, Stewart PS, 2000. Biofilm removal caused by chemical treatments. *Wat. Res.*, 4229-4233. 14. Seth AK, Zhong A, Nguyen KT, Hong SJ, Leung KP, Galiano RD, Mustoe TA. Impact of a novel, antimicrobial dressing on in vivo, *Pseudomonas aeruginosa* wound biofilm: quantitative comparative analysis using a rabbit ear model. *Wound Repair Regen*. 2014; 22: 712-719. DOI: 10.1111/wrr.12232. 15. Hobot JA, Walker M, Newman GN, Bowler PG, 2008. Effect of Hydrofibre® wound dressings on bacterial ultrastructure. *J Electr Micro*; 57: 67-75. 16. T. J. Beveridge, W. S. Fyfe. Metal fixation by bacterial cell walls. *Canadian Journal of Earth Sciences*, 1985, 22(12): 1893-1898, <https://doi.org/10.1139/e85-204>. 17. Metcalf DG, Parsons D, Bowler PG. Clinical safety and effectiveness evaluation of a new antimicrobial wound dressing designed to manage exudate, infection and biofilm. *Int Wound J* 2017; 14: 203-213. AQUACEL, AQUACEL Extra and Hydrofibre are trademarks of ConvaTec Inc. All trademarks are the property of their respective owners. ©2019 ConvaTec Inc. AP-020312-MM V1535