

Conference Report: LINK for Wound Healing Congress 2021

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The third LINK for Wound Healing Congress, powered by HARTMANN in partnership with *Wounds International*, took place in a virtual format on October 14–15, 2021. The aim was to deliver an informative educational experience and offer attendees the opportunity to learn about recent developments in wound management and discuss clinical best practice.

Over the 2 days, the congress covered an array of topics [Figure 1], such as wound infection management, compression therapy in exuding wounds, the European experience of telemedicine and negative pressure wound therapy (NPWT) during COVID-19, as well as the biochemical marker patterns in chronic wounds, pressure ulcer prevention and the impact of virtual reality in wound care.

biofilm; however, Dr Thomas Serena explained that a generic definition should be favoured, which encompasses all types of biofilm present [Box 1]. Biofilms are made up of microbes (15%) and extra polymeric substance (EPS), grow slowly and are, therefore, very resistant to antibiotics. Steps in biofilm formation include conditioning of the surface, bacterial proliferation, surface adhesion and biofilm growth and dispersion.

Dr Serena introduced a technology to detect bacteria at the point of care called 'Fluorescence Imaging'. This device illuminates the wound with a violet light, causing tissues and bacteria to produce endogenous, characteristic fluorescence signals that are filtered and displayed on the device screen in real-time. Alongside such technology, Dr Serena

Box 1. Biofilm definition (Percival et al, 2011).

A complex microbial ecosystem community of microorganisms attached to a surface and embedded in an organic polymer matrix of microbial origin.

Wound infection management

The wound infection management session opened with a discussion on biofilm, a microscopic formation that is invisible to the naked eye and represents a significant problem in chronic non-healing wounds. There are countless, ever-changing definitions of a

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Figure 1. CPD-accredited sessions delivered by international experts.

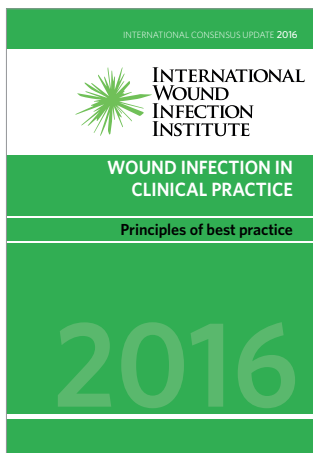


Figure 2. Wound infection in clinical practice (IWII, 2016).

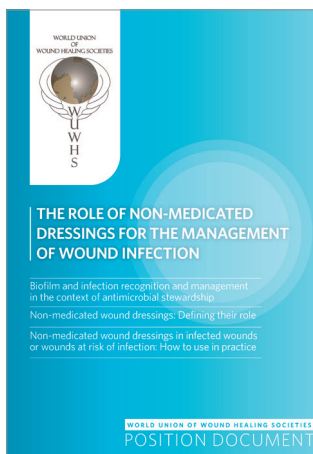


Figure 3. The role of non-medicated dressings for the management of wound infection (WUWHS, 2020).

clarified that biofilm-based wound care should encompass the '6 Ds': diagnose, debride, douse, deconstruct, destroy and defend.

The second edition of 'Wound Infection in Clinical Practice' (IWII, 2016; *Figure 2*) was launched as an update of the first edition published in 2008 by the World Union of Wound Healing Societies (WUWHS, 2008). The IWII (2016) document presents clinical signs and symptoms within the wound infection continuum, which have been widely referenced and adopted in clinical practice. Terry Swanson informed attendees that an updated version of the consensus will be available in March 2022 as a reference for both the specialist and generalist and will include an updated biofilm chapter, expanded antimicrobial stewardship chapter and a new chapter on aseptic technique for a wound dressing procedure.

This presentation highlighted the importance of therapeutically cleansing a wound and the periwound skin to avoid re-contamination. Clinicians were encouraged to embrace a 'clean it like we mean it' attitude as aggressive cleansing and debridement will make dressings more clinically effective. The best type of debridement should be based on skill, risk, tissue type, environment, equipment available and goal of care.

Effectively implementing antimicrobial stewardship (AMS) into clinical practice was explored by Professor Dr Karen Ousey. Antimicrobial resistance (AMR) is a threat to global health and arises when the organisms that cause infection evolve and can survive treatments. To prevent AMR from affecting wound management, it was stressed that we must educate ourselves and others, and always practice good hand hygiene to prevent the spread of infection. COVID-19 has encouraged hand-washing procedures; these can help in the fight against this global threat.

AMS is an approach being taken globally and can be defined as "an organisational or healthcare-system-wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness" (NICE, 2015). Consequently, clinicians should avoid antimicrobials when they are not indicated, prescribe an appropriate regimen when antimicrobial therapy is indicated, order therapy for the correct duration (i.e. stopping therapy when signs and symptoms of infection have resolved) and use an agent that has the least risk for adverse effects for the patient and community.

Implementing AMS programmes requires

education and measuring outcomes; attendees were encouraged to learn new skills in an e-learning course on antimicrobial stewardship at: <https://www.futurelearn.com/> and to download the WUWHS position document on non-medicated wound dressings (NMWDs) to find out how they can be used to help combat AMR in wounds (WUWHS, 2020; *Figure 3*).

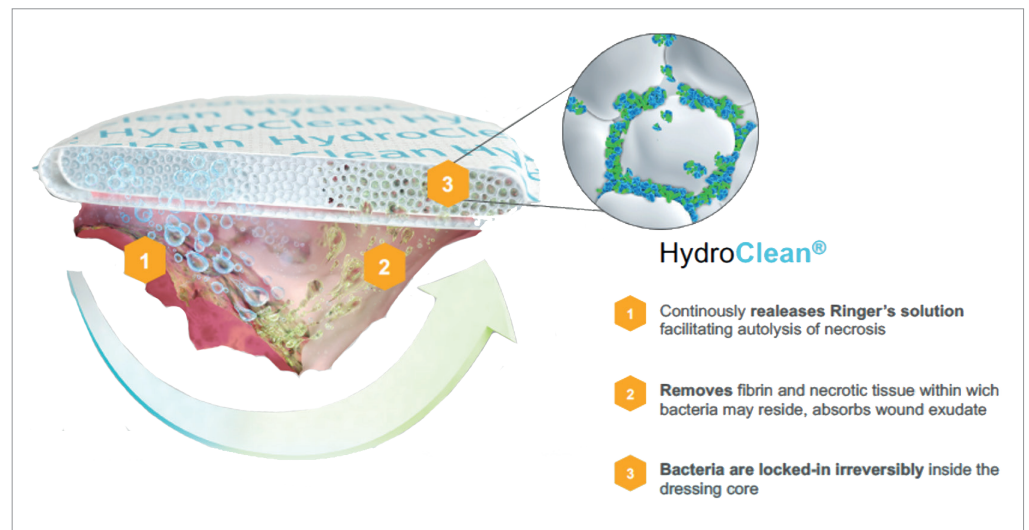
The next presentation was given by Dr Leanne Atkin on 'the good, bad, ugly and correct identification of wound infection and management'. Discussion began on the burden of wounds to the UK's National Health Service, and it was noted that 50% of all wounds in the community had at least one course of antibiotics prescribed in 2017/2018 (Guest et al, 2020). Chronic wounds have a high incidence of wound infection, likelihood of biofilm formation and chance of being prescribed antibiotics, but the focus needs to change to prevention. Dr Atkin clarified that demonstrating good practice should include prevention, education and any update in assessment, diagnosis and treatment options. The impact on a patient's quality of life raises challenges but, as a collective, clinicians can improve their skills on the correct identification of wound infection and management.

The final presentation in this session covered non-medicated therapeutic solutions in the context of AMS. It is recognised that the presence of devitalised tissue (slough and/or eschar) for a prolonged period can increase risk of infection and prevent or delay the healing process. HydroClean® (HARTMANN), a hydro-responsive, non-medicated wound dressing is a first-line option in the treatment of a wide range of wounds from the debridement stage onwards (*Figure 4*). Dr Emmanuelle Candas explained that the dressing can help to achieve the '4 Rs': rapidity of the debridement, reduction in the bacterial load, active regulation of attached metalloproteinases (MMPs), thereby rendered inactive, and respect for the viability of the fibroblasts and myofibroblasts. There is no risk of AMR with HydroClean, and it can be used across the full wound healing continuum.

Management of exuding leg ulcers

Management of exuding leg ulcers began with a presentation from Astrid Probst on the importance of exudate management and compression therapy for wet legs and diabetic foot ulcers (DFUs). It was noted that, after consulting with a medical doctor, light compression therapy can be used on patients with peripheral arterial disease and a DFU; toe bandaging should also be considered.

Figure 4. HydroClean®'s physical mechanism of action.



In addition, compression therapy should be used as one part of the treatment of patients with chronic leg wounds. It is also important to note that management of exudate is more than the choice of dressing.

Following this, Mark Collier touched upon the importance of compression and need for education. Compression is accepted as the gold standard for most ulcers on the lower limbs, supported by substantial evidence and guidelines, and has the power to heal lower limb wounds. It was emphasised that clinicians must be trained on how to use and understand the compression system they are applying and be aware that these devices can be applied by patients themselves with appropriate education.

To work, compression must be graduated, and the patient must be able to tolerate the pressure exerted — it is a therapy for life in order to maintain sustained improvement and minimise risk of recurrence.

The ongoing European Wound Management Association (EWMA) compression therapy programme aims to support optimal use of compression therapy in leg ulcer management

across Europe. More information can be found at: <https://ewma.org/whatwe-do/projects/compression-therapy>.

Next, Dr Michał Nessler introduced the topic of silicone and its role in the treatment of exuding wounds. Exudate plays a key role in wound healing and, if in excess, a superabsorbent polymer (SAP) dressing may be required to optimise conditions at the wound bed and reduce the risk of complications.

SAP dressings have a very high absorption and retention capacity and are, therefore, effective in managing excess exudate. Some have a silicone contact layer and border that helps to protect the wound bed and enable painless and atraumatic removal of the dressing, such as Zetuvit® Plus Silicone Border (HARTMANN), see Figure 5. It is anticipated that these dressings will play an important role in modern wound healing management.

Final conclusions were delivered by Alison Hopkins, which included the importance of compression as a powerful therapy and appropriate dressing selection in managing exudate and optimising patient quality of life.

Figure 5. Zetuvit® Plus Silicone Border, a versatile superabsorbent dressing used for effective management of wound exudate.



NPWT in corona time (Part 1)

A subsequent session, chaired by Professor Dr Tomasz Banasiewicz, focused on NPWT during COVID-19 (Part 1); the first presentation was given by Dr Csaba Toth on NPWT in compartment syndrome caused by necrotic fasciitis. Necrotising fasciitis is a rare but serious bacterial infection that affects the tissue beneath the skin and surrounding muscles and organs (fascia). Local symptoms include swelling of the limbs, redness, an exuding ulcer, active and passive pain in the surrounding joints and lymph node swelling.

Dr Toth expressed the importance of calculating the Laboratory Risk Indicator for Necrotising Fasciitis (LRINEC) score from laboratory values, as well as wound drainage culture and haemoculture. The importance of separating necrotic fasciitis from gas gangrene in differential diagnosis was also emphasised.

Professor Dr Mike Laukötter followed with a presentation on the treatment option of NPWT in the upper gastrointestinal (GI) tract. Endoscopic vacuum therapy (EVT) is a successful and life-saving treatment option and should be the option of choice in all hospitals when treating leaks of any aetiology in the upper and lower GI tract.

Dr Adam Bobkiewicz continued the focus on NPWT, a tool commonly used to assist in preparing larger at-risk wounds for delayed closure. It was stressed that debridement should always be performed first, then NPWT used as a bridging therapy, and free flap considered for definite soft tissue coverage.

Telemedicine in wound care

The European experience of telemedicine in wound care was introduced by the chair Dr Emmanuelle Candas. In this final session, Dr Chloe Geri detailed the advantages of telemedicine based on her experience working in France.

For the wound expert, telemedicine can help to analyse all the patient's comorbidities, provide therapeutic patient education, be used to deliver training to caregivers as the need arises, and optimise the care pathway by working effectively with the GP in order to refer the patient to a specialist, without interfering with the local care pathway.

Overall, telemedicine prevents the need to travel long distances (a significant cost for health insurers), allows access to care for bedridden patients and those with reduced mobility, creates an open discussion with the specialist and local caregiver, and

enables several experts to access the same computer-based record.

Astrid Probst described an ongoing project that started in July 2021 using telemedicine in three German hospitals to improve wound management. The project involves the use of a webcam and special computer programme, allowing clinicians to change the angle and positioning of a camera when delivering care remotely. Other options include a mobile cam wagon and special room for web conferences.

Probst explained that patients and their caregivers should be involved in this process and education provided. Essentially, the goal moving forward is to reduce the amount of time a patient with a chronic wound needs to consult a specialist in person.

Advanced cost-effectiveness models in chronic wounds

A pre-event webinar on the advanced cost-effectiveness models in chronic wounds opened day 2 of the congress and was chaired by Dr Vladica Velickovic. Dina Jankovic explained that health economics refers to any issues related to efficiency, effectiveness, value and behaviour in the production and consumption of health and healthcare. Efficient health economics requires measuring both cost and outcomes.

In this presentation, focus was placed on economic evaluation, which is a clinical trial used to identify the value gained from resources used to implement a policy, programme or intervention. Economic evaluations determine how effectively resources are being used, if there may be better ways of using them, and how these can differ according to their scope and intent.

Wound micro-environment

The next session on 'wound micro-environment: changing the biochemical marker patterns in chronic wounds' was led by Dr Louise Bundgaard. From a science perspective, Dr Bundgaard set out to discuss what we know so far about acute and chronic healing.

The goal of wound healing is to restore tissue integrity. MMPs are essential for normal healing in chronic wounds. MMP-1, MMP-2, MMP-8 and MMP-9 have been the particular focus of research in relation to wounds and play key roles in debriding damaged/devitalised extracellular matrix, angiogenesis, re-epithelialisation, wound contraction and scar remodelling.

Finding the best animal model to study impaired healing is essential. Often, animal models do not mimic human chronic wounds.

Box 2. Tips for preventing pressure and shear injury.

- Rotate a preventative dressing and place this lower on the buttocks
- Elevate heels from the bed
- Pad the area between the medical device and the skin
- Recognise that an overlay on the bed may be needed when the patient is sitting erect in bed to give enough immersion into the surface to protect the buttocks
- Avoid continuous lateral rotation
- Confirm that the sacrum is off the bed when turning.

Professor Dr Hans Smola discussed the HydroClean extension study, a further step in bridging our understanding of impaired wound healing. First, Professor Dr Smola emphasised that in the cleansing phase, which is associated with high MMP activity levels, materials in dressings that can block proteases (polyacrylate superabsorber polymers) are particularly effective. Polyacrylate superabsorber polymers have very high fluid absorption capacity, binding and sequestering MMPs inside the polymer granules and binding essential cofactors for protease activities, such as divalent ions required for enzymatic activity.

The HydroClean Extension study examined the wound healing response of venous leg ulcer wounds treated with HydroClean for 12 weeks (75.4% of wounds larger than 10cm²; wound age 11.5±8.4 months). Clinical outcomes show a robust response with relative wound area reduction reaching 48.9% ± 51.9%, and 61.4% of the patients achieved relative wound area reduction of ≥40%.

The final presentation by Professor Dr Ulrich Auf Dem Keller explored advanced proteomics in wound diagnostics. Wound exudate was described as an important biochemical indicator of wound healing status, as it contains proteins, peptides and other biological components, such as metabolites, which can be characterised to various degrees.

Extraction of wound exudate from HydroClean was demonstrated in the HydroClean Extension study. The analysis of the biochemical markers in the wound exudate saw a significant change in the expression pattern of the biomarkers during the first 14 days. Moreover, the pattern of the biochemical markers in venous leg ulcer exudate started to resemble those acute wounds at the height of granulation tissue formation and epithelialisation.

To conclude this presentation, attendees were invited to become a member of the European Tissue Repair Society at www.etrts.org and help promote knowledge and interchange between scientists, healthcare professionals, industry and other individuals that have an interest in tissue repair of all organs.

Pressure ulcer prevention

The 'Pressure ulcer prevention: trends and innovations' session opened with a presentation from Professor Amit Gefen. It was explained that COVID-19 has caused increased pressure ulcer incidence, caused by the continued use of medical devices in intensive care units.

Recognising inflammation early is vital, due

to the adverse effects this stage can create if prolonged. A particular focus on physical inflammatory markers (e.g. temperature, tissue composition) and biochemical status of the skin using monitoring of the surface was proposed.

Following this, Professor Fiona Coyer revealed that critically ill patients have the highest rates of device-related pressure injury (DRPI), yet there is limited evidence to support prevention strategies. These injuries often occur in regions with minimal soft tissue coverage, such as the nasal bridge and ears. DRPI policies, guidelines and protocols are needed for this patient population.

A follow-up presentation was given by Professor Joyce Black on the effects of COVID-19 on the skin and what changes have been observed in the US. For instance, accelerated clotting and tissue ischaemia create purpuric tissue in all body parts (not only those exposed to pressure), and patients are often extremely unwell. A higher risk of clotting problems was also detected in patients with darkly pigmented skin and purpuric skin rashes were considered a warning sign of potential serious coagulopathies, such as pulmonary embolism or stroke.

Many other skin problems were observed: urticaria with hives early in the disease, maculopapular rash lasting weeks, petechia, purpuric skin lesions in the critically ill, mottling of the skin and COVID-toes or acro-ischaemic lesions. Another concern is pressure injuries/ulcers in patients with COVID-19. See [Box 2](#) for tips on preventing pressure and shear injury.

Prevention of pressure ulcers among individuals cared for in the prone position was explored by Professor Zena Moore. Discussion was based on skin assessment and protection, use of dressings for prevention, and offloading and pressure redistribution (e.g. support surface or positioning devices) to reduce the prevalence of these largely preventable wounds. Keeping the skin clean and moisturised after a comprehensive skin and tissue assessment, and tailoring cleansing frequency to the individual to prevent dehydration of the skin, was advised.

It was suggested that clinicians should consider using protective skin coverings such as a prophylactic dressing (recommended within guidelines), under devices and bony prominences. Importantly, simple changes in the posture of the individual and in the positioning of the devices will minimise adverse effects of pressure and shear.

Following this, Dr Anna-Barbara Schlüer discussed the risks for skin and tissue damage

in paediatric patients with COVID-19 and paediatric inflammatory multisystem syndrome (PIMS). PIMS is a rare but most severe form of COVID-19 in children and resembles severe Kawasaki disease shock syndrome, as symptoms can mimic this condition. Typically, patients will present with skin lesions. It was noted that paediatric patients, especially neonates, are vulnerable to skin breakdown of any type, therefore skin care and prevention strategies from the point of care is vital.

Wound care products can be an effective treatment option but must be adapted for paediatric use and closely monitored in neonates and infants with immature skin. It was highlighted that products are needed that are designed and manufactured for this age group to help improve quality of life and patient outcomes.

NPWT in corona time (Part 2)

NPWT during COVID-19 (Part 2) started with a presentation from Dr Lenka Veverkova on the efficiency of NPWT during the pandemic. It was stressed that the sooner NPWT is used, the better, and that this therapy should be the standard treatment of early dehiscence and secondary healing defects. Importantly, early deployment of NPWT can accelerate wound healing, prevent dehiscence and reduce healthcare costs.

The benefits of NPWT were also detailed by Professor Dr Tomasz Banasiewicz; the therapy was described as effective, readily available, easy to administer and valuable during COVID-19 in helping to free up hospital beds and support discharge.

Dr Dominik Walczak shared his positive personal experience of using NPWT in reconstructive surgery and explained that NPWT can be described as a versatile therapy that provides solutions for many patients.

Impact of virtual reality on wound care practical training

The closing session, chaired by Dr Adriana Bordeanu, reflected on the impact of virtual reality on practical wound care training and was delivered by Gauthier Dubruel and Dr Maxime Ros.

Virtual reality simulation in the wound management field is safe and can help with clinical reasoning and decision-making, support precise movements, such as through dressing change/debridement, and minimise the impact of resources involved (e.g. time, teams involved, equipment and space). Essentially, if an educator learns the theory of virtual reality and there is an immersive tutorial for a learner to study the practice, then precision skills can be improved in wound care.

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All the congress sessions are now available to watch on demand via the LINK platform at: www.linkforwoundhealing.info.

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