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The May 2011 edition of the EWMA Journal Electronic Supplement consist of all the accepted abstracts for the EWMA 2011 Conference in Brussels. It is divided into 150 Oral presentations and 358 Poster presentations and it is possible to download individual abstracts as well as the entire supplement (including all the abstracts) at www.ewma.org/english/ewma-journal/electronic-supplement.html
Welcome to Mölnlycke Health Care Satellite Symposium

Investigating the Impact of Topical Antimicrobials in Wound Care
May 26, 2011 at 11.15-12.15

Wound infection is the most concerning of all wound complications. Topical antimicrobials play an important role in preventing and managing local wound infections however there are some outstanding questions regarding the usage of these agents that need to be answered.

The aim of this Symposium is to support the appropriate use of topical antimicrobial agents and to promote clinical decision-making that ensures their prescription only when clinically indicated.

Chairmen: Assoc Prof Bill McGuiness & Lt Col Steven Jeffery
Speakers: Professor Kevin Chipman, Dr Paul Silverstein & Dr Jean-Charles Kerihuel

We look forward to seeing you there!

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Welcome to the Spring Issue of the EWMA Journal, sometimes known as the ‘Conference Issue’ as its publication coincides with our annual conference. It is a great pleasure to know that conference delegates will all receive a copy of this issue, as I imagine that there may be a number who have not come across the EWMA Journal before. If this is you, please be aware that the Journal is freely available on-line via the EWMA website and also via Ebsco Host (free for NHS UK employees).

As ever we have a number of interesting papers for you as well as all the news of EWMA activities and updates from a number of our Co-operating Organisations. I would like to draw your attention to some in particular. We have two papers about biofilms, one an opinion piece from a Danish group led by Dr Klaus Kirketerp-Møller which highlights some of the problems surrounding biofilms; the other from Assistant Professor Pedro Fonseca which gives us really detailed information about biofilms and their effects. I would also recommend to you a quite different paper which looks at the impact of pain on the quality of life with patients with diabetic foot ulcers. This is the second of two papers by Bradbury and Price on this subject and they both make interesting reading.

In this issue we have what I hope is the start of a long series – the showcasing of large funded programmes of research relating to wound healing and tissue viability. Professor Nicky Cullum provides us with details of an interesting programme of Research for Patient Benefit funded by the English National Institute for Health Research (NIHR). The NIHR provides funding for programme grants lasting 4-5 years and it is very encouraging that two such programmes are wound management/tissue viability related. The other programme grant called PURPOSE will be showcased in the next issue. We would be delighted to hear from other successful research teams about their projects and showcase them in the same way.

I am writing about something completely different in the final part of my editorial – and it could be called my farewell speech. At the Annual General Meeting this month I will be retiring from EWMA Council and I have decided it is also appropriate to step down as editor of the Journal. This will not be a shock to Council as we have been discussing this for some time and the Journal editorship is being passed over into the very capable hands of Sue Bale. Sue has been on the Editorial Board for a while, so she has a very good insight into the workings of the Journal. I would like to take this opportunity to thank all the members of the Editorial Board and of the Scientific Review Panel as well as the ‘Two Katja’s’ of EWMA Secretariat for their support over the last few years. The Editorial Board and the Scientific Review Panel have been very gracious about undertaking rapid reviews for me at short notice from time to time and I have depended on them all for their considered reviews of the papers we receive. As for the ‘Two Katja’s’ – they have had the thankless task of trying to keep me to deadlines and prompting me when I forget things! I wish them all well and I am sure the Journal will continue to go from strength to strength.

As for me, well it will seem strange as I have been involved with EWMA since before it was officially established and a member of Council all of that time as well. I have thoroughly enjoyed being part of EWMA and have friends in many countries in Europe through the meetings I have attended. On a very personal note I especially appreciated these friendships and the love and support I received when my husband died. So now, I am officially winding down towards my retirement in 2012 when I have many plans which include having more time to spend with friends and family, especially my little grandson who loves to help me with my digging in my vegetable garden.

Carol Dealey, Editor
What did we find living under some silver dressings?*

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When a ship arrives on the shores of an unknown territory with scarce or no information of what is beyond the horizon, it is only confidence in the capacity and the skills of the crew and hardware that will convince the commander that the land can be taken. Intelligence is of outmost importance. Do we have the intelligence in the battle against biofilm infections to win?

In the present paper we will list what we believe is the key knowledge today and identify what science lacks, in order to suggest research strategies to resolve biofilm infections.

A Paradox:
How wonderful that we have met with a paradox. Now we have some hope of making progress. Niels Bohr (1885-1962)

It is more or less accepted that chronic wounds harbour bacterial biofilm. As illustrated later in this paper, bacterial biofilm has the ability to interfere with the human immune system in numerous ways and to prevent healing. Despite that, the majority of chronic wounds will heal if the cause or predisposing factors are treated; the venous leg ulcer will heal with compression therapy, the diabetic ulcer will heal by off-loading and the cancer ulcer will heal after radiation. The residual group, the non-healing ulcers of mixed origin, could heal if unrecognized and untreated factors are treated well. One of these factors is bacterial biofilm. But what is the difference between the biofilm in the healing group and in the non-healing group?

To stay with the military metaphors, we have reports of some battles we have won, but does that give us knowledge of the bacteria’s full weaponry?

Communication and virulence factors
Communication between bacteria is pointed out to be a target for intervention. Quorum Sensing (QS) in general and between Pseudomonas aeruginosa specifically is only a fragment of the communication between the bacteria. The N-acyl homoserine lactone QS signal molecule in P. aeruginosa will trigger the production of virulence factors such as rhamnolipids that, in vitro, can eliminate Neutrophils. Blocking or modification of QS, in theory, will enable the immune system to eradicate the bacteria even in mature biofilms. However the QS molecules differ between Gram-positive and Gram-negative bacteria and even within these. A single drug to regulate all the harmful effects of QS is hardly imaginable.

We have only a little overview of the communication in multi-species biofilm and of the communication between different mono-species biofilms. To interfere with the bacteria we need to decode their communication under different conditions. For instance: does antibiotic treatment alter the communication? Does surgical debridement? Insight into this will help us develop treatment strategies for different conditions.

Resistance
Antibiotic resistance and tolerance in bacterial biofilm is a major problem in the treatment of infections. The resistance is regulated in many different ways beside the resistance carried by the resistance genes, as in the meca in Staphylococcus aureus. Tolerance is partly QS controlled, partly influenced by different phenotypes within the biofilm e.g., different growth rates, efflux pumps etc, and by numerous other factors like the matrix components. The response from the clinician has been newer drugs, higher dosages and poly-drug treatment. Understanding the mechanisms of resistance and tolerance in biofilms can help us develop new treatment strategies and hopefully stop the rising curve of antibiotic usage and of antibiotic resistance.
Mono or multispecies biofilm
Chronic wounds are shown to be polymicrobial with no single bacterium exclusively colonizing the wounds. The microbial community is highly variable, and it has been recently published that some primary populations exist in each wound, but there can also be hundreds of different species present, many of which are in trace amounts. Using FISH, it has been illustrated that some individual microcolonies in chronic wounds only consist of a single species. Mono and polyspecies biofilms probably exist in the same ulcer, but the importance or relevance of this is not yet established.

The uneven distribution
The appearance of improved sampling techniques and molecular biology methods have illustrated that the traditional culture-dependent methods often underestimate the micro-organisms present and that a non-random distribution pattern of bacteria exists in the wounds. Differences in bacterial populations across the surface and also deep inside the wounds were found in several studies. S. aureus was primarily located close to the wound surface and P. aeruginosa was primarily located deeper in the wound. This is highly relevant for the clinician. How and when is the sample taken? In an ideal world, the whole wound would be taken out to identify every single pathogen, but this is not possible nor does it provide us with the full answer. Which bacterial strain or even subgroup is important? The newer culture-independent methods such as 16S rRNA gene-based pyrosequencing, 16S rDNA cycle, PCR, real-time PCR and fingerprinting techniques like denaturant gradient gel electrophoresis are identifying bacteria never before associated with chronic wounds. The problem for the clinician to evaluate the result of a culture-independent method is paramount. Which bacterium is truly a pathogen and which is merely passing by in search of a friendlier environment? How about a cut-off limit that indicates that this bacterium is abundant enough to be a pathogen? Well, the pathogenicity between different strains and phenotypes differs and probably differs over time within the same phenotype. Adding detection of known virulence genes to the molecular methods would be helpful in the process of interpretation.

The role of revision before sampling
Neither the traditional culturing technique nor the culture-independent methods can compensate for the three-dimensional uneven distribution of micro-organisms in chronic ulcers. When designing a protocol for sampling, we think the following should be considered: 1. Revise the ulcer before sampling. The surface is likely to host commensal flora, and it is more likely that an in-depth residing bacteria is pathogenic than a superficial one. 2: Swab a large area or take a big biopsy.

The introduction of a stringent protocol for sampling in diabetic foot ulcers reduced the frequency of MRSA by almost two-thirds in the ulcer and reduced the number of bacteria believed to be colonizers by three-fourths.

Are the predominant bacteria the villain?
Well they probably are, but some strains are highly virulent and co-exist very well with other species. The beta-haemolytic Streptococcus and the Staphylococcus aureus are an example. Yet we do not know whether the virulence of a certain strain is dependent upon another. The most abundant bacteria found by traditional methods could just be the one easiest to grow.

The paradigm shift in research:
Instead of only finding the bacterium, look for what they are doing. The questions we, both researchers and clinician, should ask are: What role does every single bacterial and fungal species have in the ulcer? What role does the biofilm formation play and is it the same for all species? Which virulence factors are the most important, and does QS play a role etc. Only by having thorough knowledge of this, will we be able to develop sufficient treatment strategies for each individual ulcer.

Until then we have to rely on “Best-Practice Principles”.

References
“Simplifying wound management by means of new technology and new definitions.”

A symposium - (60 min, Thursday 26.05.11, 11:15 - 12:15h)
“Wounds at risk – a new definition
(Chair: Thomas Eberlein, Sa Cabaneta/E, Andrew Kingsley, Devon/UK)”

- Wound at risk and its new definition by the W.A.R. Score – Thomas Eberlein, Sa Cabaneta/E (15 min)
- Sign Checker – symptoms, diagnosis, therapy – Andrew Kingsley, Devon/UK (15 min)
- Reduction of SSI in a paediatric population: using a new postoperative polihexanide containing dressing regimen in a paediatric cardiology unit – Thomas Witter (RN Child) & Dr. Aaron Bell, London/UK (15 min)
- Randomised controlled single center study comparing a polihexanide containing bio-cellulose dressing with silver sulfadiazine cream in partial thickness dermal burns – Andrzej Piatkowski de Grzymala, Aachen/DE (15 min)

B symposium - (60 min, Wednesday 25.05.11, 15:30 - 16:30h)
“Gentle Debridement – rapid and effective
(Chair: Trudie Young, Aneurin Bevan Health Board, Bangor/UK)”

- Consensus guidance for the use of debridement techniques in the UK – Trudie Young (Aneurin Bevan Health Board), Bangor/UK (30 min)
- The wound debrider – a new fibre technology for debridement: results on 60 patients – Michael Schmitz, Rengsdorf/DE (15 min)
- Gentle debridement: first clinical experience in UK – Sylvie Hampton (Tissue Viability Consultancy Services), Eastbourne/UK (15 min)

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Biofilms in wounds: An unsolved problem?

ABSTRACT
Chronically infected wounds are very costly to health care institutions and a significant cause of suffering. The major failure associated to chronic wounds is a delayed healing process due to the presence of single or polymicrobial communities that give protection to antimicrobials and host defenses. These biofilm communities can be healthy or pathogenic according to the predominant microorganism so all the prophylactic and therapeutic measures should consider the wound healing process as a window of opportunity, ideally after a sharp and regular debridement. The aim of this review is to give an additional insight to health practitioners of the importance of the biofilm paradigm in explaining the delay in wound healing and its relation to a diagnostic, prophylactic and therapeutic management.

1. BIOFILMS
a. Introduction
The ability of a microorganism to establish an infection is dependent on several factors, namely those of the host and the pathogen. There is a balance between the pathogen and the host concerning the numbers of pathogens that are needed to start colonization and advance an infection. This balance is dependent on the host defense system and the presence and expression of pathogenic factors associated to the microorganism1,2.

b. Biofilm formation
Biofilm is a community of single or multiple microorganisms that are surface attached and encased within an extracellular matrix3. This community is found attached to abiotic surfaces like industrial waters systems and indwelling medical devices4 or biotic like mucosal surfaces5. Biofilm formation in the host is a strategy of the microorganism to survive the host defenses and also to optimize the use of the nutrient rich environment and the cooperative work between the biofilm organisms6.

Biofilms can have either a positive effect such as the biodegradation7 in sewage treatment8 or a negative effect such as corrosion of pipes, infection of indwelling medical devices and the persistent infections in cystic fibrosis and chronic wounds9,10.

Bacteria can grow in a free-living planktonic state or in a sessile form, a complex process that requires a sequence of coordinated activities11. This complex sequence starts with the adhesion of the microorganism. This adhesion can be reversible at first and then becomes irreversible. Following this there is the formation of microcolonies in a biofilm)10.

REFERENCES
Science, Practice and Education

i. Adhesion

Planktonic motile and non motile bacteria can become sessile as they start the adhesion process to an abiotic or biotic surface. For this initial step the presence and functionality of several adhesins such as flagella and fimbrae are needed. There are two possible stages, namely the reversible adhesion in which bacteria can revert to the planktonic state and the irreversible adhesion that is a really step to microcolony development and biofilm formation (Figure 1).

![Figure 1. Biofilm development in Pseudomonas aeruginosa. This flowchart divides biofilm formation in different steps involving specific events and bacterial properties. Firstly, planktonic bacteria migrate to the surface and adhere (A, B). Once adhered, bacteria divide and twitch to form microcolonies (C). Then alginate production begins that helps to cement the biofilm matrix in a three dimensional structure (D). Some of singular or aggregate cells (also referred as “planktonic biofilms”) are released from the biofilm and adhere to the surface in a cyclic pathway (E).]

LW-Lifshitz-Van der Waals forces; EL: electrostatic forces; AB: acid-base interactions; OMP: outer membrane protein; LPS: lipopolysaccharide (Adapted from Fonseca et al 2006).

ii. Microcolonies and biofilm formation

After the initial irreversible adhesion, the cells start to divide and form cell clusters called microcolonies. The dividing cells produce quorum sensing molecules that allow the aggregation of the microcolonies. These structures are thus able to produce a matrix of extra-cellular polymeric substances (EPS) that encases the aggregating cells in a biofilm. These cells can have a flagellum-drive movement within the biofilm thus they are not evenly distributed in the biofilm and in this particular case they demand the existence of interstitial water channels that also facilitate the exchange of nutrients and wastes.

Expression of genes was found to be different in several steps of biofilm formation; in fact the av-

The microcolonies and biofilm formation is a complex process that involves multiple factors and a variety of interactions, namely the adaptive responses of the sessile microorganisms. In fact the eventual presence of optimal amount of nutrients can be an inducing factor for biofilm dispersal due to increased growth of the microorganisms. Some of the biofilm cells can switch to a planktonic free-swimming phenotype or can detach as aggregates ("planktonic biofilms") and this process aids the spread of the infection by the restarting of the biofilm formation in other locations.

### iii. Biofilm physiology

The knowledge of biofilm physiology is of utmost importance to understand the activities of the microorganisms within the biofilm. This information is essential for any approach in order to control biofilm formation. There are several methods that can give some insights into biofilm morphophysiology such as the use of light, epifluorescence, electron and confocal laser microscopy.

Biofilm architecture is an important factor that influences the detachment process and is affected by the amount of extracellular polymeric substances (EPS) produced. EPS is often composed of polysaccharides, lipids, proteins, nucleic acids and enzymes, and is an aid to the bacterial adhesion process. The bulk of the biofilm is 75-90% of EPS with only 10-25% being made up of cells. Additionally it is known that biofilms from different species have their singular cellular and non cellular arrangements. An example of this are the water channels that are often dependent on the degree of hydration of the biofilm and are of utmost importance in the intake of the nutrients and excretion of the wastes, and are thus essential for biofilm survival. There are also several differences in a biofilm’s architecture due to the mono or poly specific character of the biofilm. The microbial ecology can also influence the production of virulence factors and have an effect in the biofilm phenotype as a collective virulence parameter and this may be caused by the communication between the cells. The ability to adapt and have adequate responses to the series of changes in the environment is dependent on cell-cell signal transduction systems. Microorganisms can monitor and respond to the presence of others by the production of signaling molecules and this process is called quorum sensing. It is known that this process controls biofilm formation through the secretion of autoinducers, thus representing a key role in the regulation of biofilm architecture, the expression of virulence factors and in the dispersion of organisms. Nevertheless, there are some strains of *Pseudomonas aeruginosa* that can form biofilm independently of quorum sensing. The inhibition of cell communication has been shown lately as a new treatment strategy, in particular in the prevention of biofilm infections such as in the case of garlic that inhibits quorum sensing in *P. aeruginosa*.

### c. Factors that interfere in Biofilm formation

The formation of biofilm is influenced by various factors that range from the morphophysiology of the microorganisms to the complexity of the environment in terms of nutrients or the presence of chemical and physical agents.

The ability of the microorganisms to adhere to abiotic or biotic surfaces as well as the adherence rate is known to influence the formation of the biofilm. Bacterial adhesins such as flagella or type IV fimbriae and the overall hydrophobicity of the bacterial surface can determine if the attachment to the surface is reversible or irreversible. The availability of nutrients is another important factor for the production of quorum sensing molecules, enzymes or amino acids that are essential for adhesion and biofilm formation.

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31. Lee J, Jayaraman A, Wood TK. Indole is an inter-species biofilm signal mediated by the expression level over 50% of the proteome.
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i. Effect of chemical and physical agents on biofilm

The presence of specific substances during biofilm growth can affect it either stimulating or inhibiting formation. It is known that certain substances have a chelating effect for iron, which is important in low concentrations for sessile growth. Another substance, indole, which is secreted by several gram negative microorganisms, such as *Escherichia coli*, increases biofilm formation in *Pseudomonas aeruginosa*. The application of electric currents, however, can inhibit biofilm development and have a synergic activity with the antimicrobials in the attack on biofilms. This synergistic activity may provide a competitive advantage to the microorganisms and a real increase in the pathogenic effect of a biofilm in several diseases and infections, namely in chronic wounds, resulting in enhanced tissue degradation or impairment of the host immune response. Another factor is the shear stress that affects the adhesion and biofilm formation process. In fact, the hydrodynamic conditions in which the biofilm occurs can influence the architecture and strength of the biofilm. Additionally, biofilm formation can occur not only in laminar but also in turbulent flow, although it is known that for this case quorum sensing is less effective.


d. Biofilm detection methods

The early or even late detection of biofilms is of utmost importance. There are several methods to determine the presence of the biofilm *in vitro* and *in vivo* in wounds isolated or in combination. Shape and size of the microorganisms in a singular or mixed culture and the eventual presence of polymorphonuclear neutrophils (PMN) in a tissue can be assessed by light microscopy. If the microscope also has a fluorescent light it is possible to use fluorophores as stains, assessed by light microscopy. If the microscope also has a fluorescent light it is possible to use fluorophores as stains, assessed by light microscopy. If the microscope also has a fluorescent light it is possible to use fluorophores as stains, assessed by light microscopy. If the microscope also has a fluorescent light it is possible to use fluorophores as stains, assessed by light microscopy. If the microscope also has a fluorescent light it is possible to use fluorophores as stains, assessed by light microscopy. If the microscope also has a fluorescent light it is possible to use fluorophores as stains, assessed by light microscopy.


**Candida biofilm of HIV-positive patients with chronic gingivitis and necrotizing periodontitis.**

**Occurrence of yeasts, enterococci and other enteric bacteria.**

**Optimization of processing conditions for the quantification of enterococci biofilms using microtitre-plates. J Microbiol Methods.**

**Association patterns of *Pseudomonas aeruginosa* clinical isolates as revealed by virulence traits, antibiotic resistance, serotype and genotype. FEMS Immunol Med Microbiol 2007; 51:505-16.**

**Effect of a biofilm in several diseases and infections, namely in chronic wounds, resulting in enhanced tissue degradation or impairment of the host immune response.**

**Another factor is the shear stress that affects the adhesion and biofilm formation process.**

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**Another substance, indole, which is secreted by several gram negative microorganisms, such as *Escherichia coli*, increases biofilm formation in *Pseudomonas aeruginosa*.**

**The application of electric currents, however, can inhibit biofilm development and have a synergic activity with the antimicrobials in the attack on biofilms.**

**This synergistic activity may provide a competitive advantage to the microorganisms and a real increase in the pathogenic effect of a biofilm in several diseases and infections, namely in chronic wounds, resulting in enhanced tissue degradation or impairment of the host immune response.**

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**Biofilms are resistance phenotypes for microorganisms that give protection to the antimicrobials and to the immune system, namely through the effect of EPS and the slow growth rate of the microorganism within the biofilm. This biofilm ability often results in chronic infections.**

**The close proximity of microorganisms within the biofilm creates conditions for a better transference and acquisition of resistance and virulence genes.**

**These biofilm resistance strategies result in a huge resistance to antimicrobials as compared to their planktonic counterparts and under certain circumstances the detached biofilm can lead to an embolism when transported through the veins and this is definitely life threatening.**

**Biofilms are often the cause of indwelling medical device associated infections.**

**These devices, such as catheters, prosthesis, contact lenses etc serve as reservoirs for the microorganisms and are a source of nosocomial infections.**

**Several species of bacteria can be biofilm forming microorganisms such as *Staphylococcus species*.**

allows a 3D visualization of the biological sample, and if coupled with a live/dead stain, to see the composition and distribution of living cells within the biofilm structure *in vivo* and in real time. If necessary it is possible to have detailed information in the arrangement of the biofilm structures such as the type of adherence to the matrix or to a specific matrix through assessment using scanning electron microscopy (SEM), but, if available, it is also possible to have the levels of resolution of the SEM using “in vivo” conditions and studying real time effects of the antimicrobials, using atomic force microscopy (AFM). There is always the possibility to obtain the percentage of colony forming units, but, in the main, planktonic cells grow rather than biofilm cells. In this case special care must be taken if the biofilm is polymicrobial such in the case of wounds and if there is the possibility of the presence of anaerobic bacteria.

e. Medical importance of Biofilms

Biofilms are resistance phenotypes for microorganisms that give protection to the antimicrobials and to the immune system, namely through the effect of EPS and the slow growth rate of the microorganism within the biofilm. This biofilm ability often results in chronic infections. The close proximity of microorganisms within the biofilm creates conditions for a better transference and acquisition of resistance and virulence genes. These biofilm resistance strategies result in a huge resistance to antimicrobials as compared to their planktonic counterparts and under certain circumstances the detached biofilm can lead to an embolism when transported through the veins and this is definitely life threatening.

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Biofilms are often the cause of indwelling medical device associated infections. These devices, such as catheters, prosthesis, contact lenses etc serve as reservoirs for the microorganisms and are a source of nosocomial infections. Several species of bacteria can be biofilm forming microorganisms such as *Staphylococcus species*.
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Biofilm composition and architecture represent key roles in resistance to antimicrobials. Besides the singular resistance of each cell, the biofilm can be seen as a community that has a resistance phenotype and this starts in the beginning when adhesion occurs and increases with the biofilm development. There are several mechanisms that allow the biofilm to work as a resistance phenotype: a) the oxygen tension, the pH and the chemical substances within can alter the activity of the antimicrobials, b) the slow growth as a result of the low oxygen tension makes the microorganisms less susceptible to the antimicrobials that are exponential growing cells, like the β-lactams, c) the biotic or abiotic surface and the hydrodynamics (shear stress) of the biofilm formation process can select subpopulations resulting in different architectures and compositions of the biofilm, d) the close proximity of the microorganism within the biofilm creates the perfect conditions to the transfer/acquisition of genes. Additionally the microorganisms seem to increase their ability to mutate and this can affect the antimicrobial resistance, e) quorum sensing molecules can regulate resistance genes but their absence does not necessarily mean a reduction in the susceptibility to the antimicrobials, and f) extracellular matrix (EPS) work as a physical barrier that restricts the diffusion of the antimicrobial agents into the biofilm.

2. BIOFILMS IN WOUNDS – WHY THEY ARE A PROBLEM?

a. Wound formation

In the human body the frontier to the external environment is the skin. This multi-layered structure is an anatomical barrier that also helps in the homeostatic preservation, thermoregulation and protection against infections. An additional condition of the skin is its dryness, and the ability to secrete antibodies and inhibitory substances. The skin is also the surface for the proliferation for microbial normal flora that has the function of preventing the adhesion of pathogenic microorganisms. A wound is a discontinuity of the skin that can be in more than a tissue or organ and have accidental or deliberate causes.

b. Effect of Biofilm on wound healing – the biofilm paradigm

The pathogenicity of the microorganisms is dependent on their virulence ability within the wound. This capability of most microorganisms results from their production of toxins and enzymes, or from their biofilm production abilities. In the case of a slow reaction of the host to the biofilm, and in the particular case of an immunodeficient host, it increases the possibility of the development of chronic infections. The PMN have little reaction against the “community resistance phenotype” called biofilm which in the case of wounds can be polymicrobial and thus quite recalcitrant. Virulent organisms, such as *Pseudomonas aeruginosa* and *Staphylococcus aureus*, when forming biofilms in vivo, show less susceptibility to antimicrobials compared to the planktonic culture. There are two main wound microbial biofilm hypotheses that can explain why biofilms delay wound healing. The first suggests that there are specific bacterial species, despite the complexity of microbial populations within the biofilm, which are responsible for the delay in wound healing and in the overall infection process. The second argues that there is no specific bacterial species but that all the microbial community is responsible and the biofilm works as a...

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unit. Both theories are important to explain the wound healing process and need to be proven, so both may be taken into account by practitioners considering wound management strategies.

The biofilm in the chronic wound is composed of a community of microorganisms in which the overall effect in the community unit is greater than the sum of its singular or specific parts, thus an important approach to promote wound healing could be to enable an “ecological shift” that increases growth of non-problematic bacteria. This could be a prevention approach with the development of techniques to continuously avoid the predominance of pathogenic bacteria within the biofilm. This could involve the use of probiotics and the idea of helpful biofilm in wound healing. It is therefore of utmost importance to control the microbial progression during wound healing and to maintain “healthy” biofilms, thus avoiding the development of pathogenic biofilms. If the biofilm community pathogenic effect exceeds host immune response, there is a compromised wound healing process.

3. HOW CAN BIOFILMS BE TREATED?

a. Diagnosis of biofilms in wounds

The diagnosis of wound infection is mainly done on the basis of clinical symptoms but it was demonstrated that the microbial load of wound samples can be higher than $1 \times 10^5$ microorganisms/g of tissue with no signs of clinical infection, thus showing an urgent need for revision of the established guidelines for wound infections diagnosis. There are cases of chronic wound infections that progress to septicemia or even death because they fail to show clinical symptoms. Recently, it has been shown that using culture-dependent methods in the wound microorganisms enable the isolation and identification of only 5% of the bacterial species, thus biopsy samples are a better option to have accurate information on the microbial diversity in the biofilms. Besides an improved sampling technique, there is the emergence of molecular biology methods, but the best option is perhaps the combination of cultivation/molecular methods.

There are several microorganisms that are predominant in the biofilms that cause chronic wounds and these include fastidious or anaerobic biofilm growing bacteria such as *Staphylococcus*, *Pseudomonas*, *Serratia*, *Bacteroides*, and *Corynebacterium*.

The identification of the biofilm bacteria in wounds can be assessed using several molecular methods such as fingerprinting, using 16S rRNA, fluorescence *in situ* hybridization (FISH), pyrosequencing and quantitative PCR (Q-PCR). This last method enables a characterization within a few hours of the microorganisms present in wounds and has already been used to demonstrate that the numbers of certain bacteria such as *P. aeruginosa* and *S. aureus* varies between samples which are taken in different locations in the same wound. But if detection of the relative contribution of the bacteria or yeast is needed in a chronic wound sample, pyrosequencing methods are recommended, although they only give return results in 24 hours. The use of rRNA gene based PCR techniques, that is using Q-PCR and pyrosequencing, gives information regarding presence of viable and nonviable bacteria, prevalence and type of bacterial species, but there is no information concerning the structural organization and spatial distribution of the bacteria in the biofilm nor even any information on the relative contribution of each bacteria to the disease pathogenesis. This can be obtained by visualization of the bacterial communities that exist in the wound biofilms by using FISH with species-specific peptide nucleic acid-PNA DNA probe plus a PNA probe for all eubacterial species. Burmolle et al. (2010) describe the use of a combination of PNA-FISH and confocal laser scanning microscopy (CLSM) to assess the spatial distribution and structural organization of biofilm bacteria in chronic wounds. The combined method demonstrated that the microbial communities in chronic wounds...
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**Symposium A**
Reducing the human and economic cost of wounds - Part I

**Speakers**
Prof John Posnett
Prof Christine Moffatt
Prof Donald Hudson

**Date:** Wednesday, 25th May  
**Time:** 12.30 - 13.30  
**Venue:** Gold Hall

**Symposium B**
Reducing the human and economic cost of wounds - Part II

**Speakers**
Prof John Posnett  
Prof Patricia Price  
Dr Roland Becker  
Dr John Lantis

**Date:** Thursday, 26th May  
**Time:** 16.00 - 17.00  
**Venue:** Silver Hall

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are often polymicrobial but the bacterial aggregates are mainly composed of a single bacterial species. Fazli et al. (2009) showed by using PNA-FISH and CLSM there is a nonrandom distribution of the bacteria in wounds, for example, P. aeruginosa is primarily at the deepest part and S. aureus is often near the surface. Dowd et al. (2008) described some repeated patterns of coaggregation that have the ability to work in synergy to produce chronic infection as "functional equivalent pathogroups" (FEPs). The above referred techniques are complex and limited to research laboratories, thus there is a need to develop simpler means of detecting biofilms in a routine microbiology diagnostic.

b. Biofilm Treatments for chronic wounds

Patient quality of life can be affected by a delayed wound healing process, thus the wound treatment aims to achieve its goal within a reasonable time frame. This is possible if appropriate care is taken and attention paid to the condition of the wound and of the patient. Some predisposing factors such as underlying diseases and microbial infection with biofilm forming organisms can influence the healing process of infected and chronic wounds. There are several strategies targeted towards promoting wound healing in chronic wounds and they must take into account the factors that are responsible for the delay in the healing process. These factors should be identified as soon as possible to prevent complications. Nevertheless, if complications occur there are treatment strategies that range from using ultrasounds, debridement, negative pressure, hyperbaric oxygen, and others.

First of all, foreign bodies should be removed from the wound because their presence interferes with the healing process, thus a physical intervention is of utmost importance for the management of biofilms. This cleansing can be done by mechanical, chemical or biological methods. Additionally the presence of devitalized tissue serves as a physical barrier against host defenses and can also be done by larvae which feed on the dead tissues. The above mentioned techniques are "functional equivalent pathogroups" (FEPs). The above described some repeated patterns of coaggregation that have the ability to work in synergy to produce chronic infection as "functional equivalent pathogroups" (FEPs). The above referred techniques are complex and limited to research laboratories, thus there is a need to develop simpler means of detecting biofilms in a routine microbiology diagnostic.

In the wounds there is an autolytic debridement when the healing process is developing in the right timeframe and this process only functions when the wound is moist and the patient's own enzymes can be used. Debridement can also be done by larvae which feed on the dead tissues and excrete bactericidal products that help to reduce the wound's bioburden, and the correct procedure is to identify the microorganisms involved and to determine antimicrobial susceptibility, although in particular cases there is a need for removal of large amounts of necrotic tissue and this demands a more extreme course of action such as a surgical procedure.

Treatment of biofilms in wounds often needs the use of antimicrobials in a systemic and/or topical therapy. Antimicrobials can also be used for prophylactically especially in immunocompromised patients, but the correct procedure is to identify the microorganisms involved and to determine antimicrobial susceptibility, although the information is always reduced because they are determined with planktonic, not sessile populations. Antimicrobials can be administered topically as wound dressings, orally, or injected intravenously or subcutaneously and the main objective is to reduce or completely remove the microbial load of wounds. Several...
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antiseptics, such as Povidone iodine, can be used alone or in combination with the antibiotics in order to achieve increased antimicrobial activities\textsuperscript{81}. In fact one of the possible advantages of using antiseptics is the reduced probability of developing bacterial resistance since they have several targets in the bacteria.

The use of silver as part of dressings has also proved to be successful, and this is due to the bactericidal properties of silver\textsuperscript{82}, as already reported for silver catheters\textsuperscript{83}. Silver lethal activity works at much higher concentrations for sessile bacteria as compared to planktonic bacteria\textsuperscript{84}. Another known antiseptic is honey, which is claimed to have antibacterial activity through the action of its phytochemicals and the ability to promote healing\textsuperscript{85-87}.

Several works have demonstrated the importance of drug release in the prevention of biofilm formation\textsuperscript{88} and it is known that the rate of antimicrobial release from a dressing or catheter determines its efficacy\textsuperscript{89}. Combinations of antimicrobials with synergistic activity can be used as in the case of bacitracin-polymyxin\textsuperscript{90} because there are major difficulties in having an effect on dormant cells within the biofilm\textsuperscript{91}. Another issue is that systematic antibiotics have only 25-32% efficacy against biofilms\textsuperscript{70} because they only suppress rapidly growing cells at the outermost active edges of the biofilm\textsuperscript{91}.

It is of utmost importance to combine strategies, i.e. combining the use of debridement and antibiotics, and especially those with antibiofilm abilities. There are a number of well-known antibiofilm agents, some of which have already been referred to during this review, like Lactoferrin and the use of phages and pulsed electric fields, but there are others such as Xylitol, Gallium, EDTA, Dispersin B, as well\textsuperscript{92}. Gallium can disrupt Fe-dependent processes because many biological systems cannot distinguish Ga\textsuperscript{3+} from Fe\textsuperscript{3+} and this is particularly important for \textit{P. aeruginosa} biofilm development\textsuperscript{93}. Martineau and Dosch (2007)\textsuperscript{94} have recently described that EDTA in a wound gel can have some efficacy against \textit{P. aeruginosa} biofilms. Dispersin B targets the EPS and degrades the community structure of the biofilm\textsuperscript{95}.

As a conclusion, in order to suppress and eliminate biofilms, a triple strategy should be used incorporating topical antiseptics and systemic antibiotics for damaging of cell metabolism and integrity, using antibiofilm antimicrobials that act in the biofilm as a microbial community that works together in a “resistance phenotype”\textsuperscript{70} and using a strategy that augments the host’s defenses\textsuperscript{95}. Alongside the triangle of antimicrobial – pathogenic agent – host, we must consider the environment in which all three work together and this can be also used to enhance wound healing. An example of this is the use of topical oxygen therapy that involves the use of supersaturated oxygen delivered to the wound over a certain time period which increases protein production and cell homeostasis\textsuperscript{50}. Another example is the use of hyperbaric oxygen therapy that supplies adequate tissue oxygenation\textsuperscript{96}.

Prevention of biofilm should be the first and important aim of any strategy for infection control. Nevertheless with biofilm therapeutic measures, care should be taken in order to reduce the quantity of the microorganisms as well as the virulent factors they express allowing a better and facilitated work for the immune system\textsuperscript{57}.

Several studies show that there are pathogens that can form biofilms within 10-16 h of culture\textsuperscript{45} and this ability has been reported in vivo in animal for 48-72 hours\textsuperscript{85}. This ability of some pathogens to easily form biofilm in wounds should be stopped in the early step of the initial adhesion, and this is particularly important in immunocompromised hosts. In this case the use of natural substances that stimulate cellular growth may promote enhancement of regenerative process as is the case in the use of bone marrow-derived cells\textsuperscript{58} or stem cells\textsuperscript{59}. Another strategy to control biofilms is the use of phages to which particularly the young biofilms seem to be more susceptible\textsuperscript{100}. Lactoferrin is a protein present in the gingival fluids and in saliva that has iron-binding properties. This ability is particularly important in the case of \textit{Pseudomonas aeruginosa} wound biofilms, since they need iron for their stability. The use of Lactoferrin can interfere with normal biofilm formation.
allowing improved efficacy in the antimicrobial action\textsuperscript{101}. Another biofilm control measure is to use substances that can interfere in the cell to cell communication, namely by quorum sensing attenuation\textsuperscript{26}. Garlic has been used for the rapid clearance of \textit{P. aeruginosa} from the lungs of mice models\textsuperscript{102}. Synergistic activity has been reported between tobramycin and bismuth against \textit{P. aeruginosa} quorum sensing, virulence factors and biofilm formation ability\textsuperscript{103}. Several studies have demonstrated \textit{in vitro} that the use of honey can influence biofilm formation\textsuperscript{85} thereby having the possibility of topical application in wound management\textsuperscript{104}. Another strategy is to disrupt the biofilm in wounds by using ultrasound\textsuperscript{105}, electric stimulation or electromagnetic therapy\textsuperscript{106}.

In order to evaluate potential biofilm interventions there is a need for the development of biofilm models\textsuperscript{13,107,108}, however before effective anti-biofilm interventions are accepted there is a need for clinical evidence of biofilm associated infections.

CONCLUSION REMARKS AND FUTURE WORK
The increased number of chronic wounds in ageing populations is a major problem. The knowledge of the relation between the concepts of wound chronicity and biofilm is of utmost importance. It is therefore crucial to develop means to diagnose biofilm infections, and there is a strong need for effective treatment strategies. However it should be stated that there are no routine biofilm detection methods available yet and effective interventions depend on the quality of the diagnosis.

It is certainly possible to explain, under a biofilm paradigm, the delay in chronic wound healing, therefore the biofilm communities must be identified as soon as possible as well as their distribution within the biofilm, but more information regarding their specific contribution to the pathogenesis is fundamental for the selection of adequate therapeutic methods. The debridement or post-debridement of chronic wounds can induce a restart in the biofilm formation and this can create a window of opportunity that should be exploited using a combination of methods, within an antibiofilm strategy. The relative predominance of pathogens in the biofilm community can also be avoided by promoting the shift to healthy biofilm that can be an easier target for host defenses.

Acknowledgements
I gratefully acknowledge to Dr. Clara Extremina from REQUIMTE, Faculdade de Farmácia, Universidade do Porto and to Professor A. Freitas da Fonseca, for the critical review of the manuscript.
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Diabetic foot ulcer pain: The hidden burden (Part two)

ABSTRACT

Background: Diabetic foot ulcers (DFU) are often considered painless due to sensory peripheral neuropathy, with pain only occurring with infection or other complications (Sibbald et al., 2006). Recent research suggests DFU pain is more prevalent than expected and severely impacts on quality of life (Ribu et al., 2006; Bengtsson et al., 2007).

Aim: To explore the effect of specific DFU pain on life quality from the patient’s perspective.

Methods: Purposive sampling identified three patients from a specialist DFU clinic. Data was collected using semi-structured interviews. Interviews were recorded, transcribed and analysed using thematic content analysis.

Results: Four themes emerged: Experience of Pain; Physical Effects of Pain; Coping, Support and Social Impact; and Psychological Impact. Results indicated that DFU pain affected patients physically and psychologically, especially with regards to sleep, mobility and social roles. Feelings of depression, isolation and loss of independence were expressed. Pressure from footwear and dressing changes caused or worsened DFU pain.

Conclusions: DFU pain is an under-recognised phenomenon which can be both severe and debilitating, and also negatively impact on life quality across physical and psychosocial domains. Further qualitative work into the patients’ lived experiences of DFU pain is needed to help clinicians understand the relevance to holistic diabetic foot care and service provision.

INTRODUCTION

Diabetic Foot Ulcer (DFU) pain is a phenomenon which has been both under-estimated and under-researched. The exploratory study published in part one of this article on the presence and characteristics of DFU pain found that patients can experience specific DFU pain despite the presence of neuropathy, and not always related to Decorrelated complications. This supported the findings of previous works1,2. A second phase was therefore conducted within the same study to investigate the impact of specific DFU pain on quality of life (QoL).

Previous research has indicated that DFUs negatively impact on QoL3,4,5, as does pain from various causes6,7,8,9. DFU can significantly decrease QoL for a variety of reasons, including decreased mobility, diminished independence, loss of employment, increased risk of amputation and repetitive trips to clinicians for care10. Despite this, there is relatively little research in this area. Although pain is often raised as an issue in studies on DFU and QoL, none have looked specifically at DFU pain and QoL from the patient’s perspective.

Ribu et al.1 evaluated health-related quality of life (HRQoL) as part of their research into DFU pain using generic and disease-specific measurement tools. Results found that patients experiencing DFU pain had consistently low scores in both physical and psychological domains.

A qualitative study on the patient’s perspective of living with a DFU identified pain as one of six commonly experienced problems11. Almost all patients experienced pain at some time, with most reporting ulcer pain woke them at night and having to lie in certain positions to avoid pressure on the ulcer. Pain was reported when walking even short distances. Three patients avoided taking analgesia due to fear of reliance. Pain was mainly discussed in relation to painful neuropathy, although direct relationship with the ulcer or other causes was not considered. The effect of the pain in causing sleep deprivation and fatigue affecting overall QoL was highlighted.

Pain was raised as a significant factor in a phenomenological study12 to determine the QoL issues of 21 patients with DFUs. Just under half of the patients complained of ulcer pain impairing their ability to walk, discomfort on lying down and during dressing changes. The authors felt unable...
to confirm that pain was definitely originating from the ulcer rather than an underlying pathology, but it suggests that patients feel they are experiencing ulcer pain which is impairing their QoL. A comparable study by Watson-Miller\textsuperscript{13} yielded similar results.

Other studies also found patients with DFU experienced pain, but did not further explore the nature of that pain or its specific impact on QoL\textsuperscript{4,14,15}. Despite providing useful information on the effect of DFU on HRQoL, studies generally have small sample sizes and the subject would still benefit from further research. The difficulty with measuring HRQoL with specific regard to foot ulcers in diabetic patients is that they often do not experience only one complication of the disease in isolation. This can make it difficult to determine with certainty that it is the ulcer that is affecting QoL, especially in studies which do not exclude patients with other diabetic complications. The lack of disease-specific tools for DFU until relatively recently may also have hindered progress within this field – as Vileikyte\textsuperscript{16} stated, the effects of DFU on HRQoL are distinct from those associated with the disease itself and need to be addressed separately.

Overall, it is clear from the qualitative work undertaken, which allows the patients to voice their individual difficulties and experiences, that pain is an important contributor to reduced QoL for patients with DFU. Unfortunately, QoL studies related to DFU generally do not provide enough detail on the effect of pain as this is not their primary aim. Substantial conclusions cannot be drawn from their results with relation to pain, but they do provide a useful overview and some insight into the nature and degree of the problem, thereby justifying the need for more specific work.

The need for further research on the subject of pain from DFU and QoL was thus identified to determine the extent to which the problem needs consideration in clinical practice.

**METHODS**

An exploratory research design was continued in this phase using qualitative methods. Participants were chosen using purposive sampling from the same local specialist diabetic foot clinic as in phase one. Basic inclusion/exclusion criteria were used to assess if a participant was suitable (Table 1).

Face-to-face semi-structured interviews were considered an appropriate method to collect qualitative data on the effect of DFU pain on everyday life. An interview schedule was developed to guide the conversation onto relevant topics based on the study aims and issues identified within the literature, but with a particular focus on pain. The first interview acted as a pilot of the schedule to determine if the questions were valid and easy to understand, and to gain insight into how the questions were interpreted by patients to try to improve reliability. Following this the interview schedule was shortened and revised to include broader topic areas.

The interviews were recorded and manually transcribed. Reflective notes were also made shortly after completing the interview recording any non-verbal communication, the researcher’s thoughts on the topics covered and the response of the participant to ensure the best quality information was assembled for analysis.

The study protocol was approved by the Local Research Ethics Committee. Confidentiality and anonymity were maintained throughout the research process, and written informed consent was taken. Identification of suitable participants and completion of the interviews occurred over a six month period. All participants chose to be interviewed at home, and each interview lasted approximately 30 minutes.

The taped conversations were transcribed by the researcher and then verified by a second researcher not involved with the interviews. A copy was sent to the appropriate participant for verification and to make any required changes or additions. These processes were performed to improve reliability and minimise bias within the study findings. The transcribed and verified data was then analysed using thematic content analysis, guided by elements of the method published by Burnand\textsuperscript{17}.

In an effort to demonstrate methodological rigour and reduce researcher bias, the identified data categories were checked by a second researcher to ensure the primary interpretation fairly represented the data. The themes were then examined to identify any associated relationships which were discussed and compared.
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RESULTS

Three patients were recruited between September 2007 and January 2008. The intended sample was five patients but, mainly due to the time delay while waiting for ethics approval, a number of patients achieved ulcer healing and were discharged, or no longer had pain in their ulcer. Some patients refused to participate.

The study sample, again although small, presented views from a male and female perspective (Table 2). The type and duration of diabetes and ulcer aetiology and duration were similar across the group. All the patients had complex medical histories consisting of independent diseases and diabetes-related complications, which could impact on QoL. The interview data will be presented using the four themes generated during analysis.

Experience of Pain

This theme was generated from the patient’s descriptions of their pain, when it occurred, the factors that caused it or made it worse and how they managed it.

Participants described their pain in various ways – sharp, unexpected, variable in occurrence but of severe intensity, intermittent, spontaneous, continuous and unrelenting. One described it “…as if my foot were in a bed of stinging nettles”, while another stated it was the worst he’d ever had.

None of the patients seemed surprised to be experiencing pain, despite having peripheral neuropathy. One felt that pain could even be a good sign, while another was more surprised at its severity.

The main issue consistently raised relating to factors that increased or worsened pain was application of pressure on the wound, especially during dressing changes and from footwear. All patients described pain occurring in bed due to pressure from bedding or moving to lie on the ulcer: “…I can’t sleep in bed, I can’t stand blankets or anything on the foot”.

Table 2: Sample Demographics

<table>
<thead>
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<th>Study number</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
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<td>86</td>
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<tr>
<td>No. of Diabetes Related Complications</td>
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</table>

Two patients having dressings changed by family members stated it was not terribly painful, except during cleansing and if the dressing had ‘dried out’.

The patient having dressings changed by District Nurses remarked that cleansing could be painful, but felt the pain at was more dependent on the individual performing it, describing some as ‘rough-handed’. He also experienced pain during dressing application and for some time afterwards: “If anybody touches it, it’s hell”.

Difficulty finding footwear that did not exert pressure and cause pain was expressed by two patients. Both had bought their own shoes or found solutions, but not always ideal ones, such as wearing sandals throughout the winter. One was particularly frustrated with the service provided by the hospital:

“The shoes they make are too heavy and are no good to me, but I can’t make them understand that”; “…they bruised all my feet and aggravated the toe”.

Analgesia was used by all three participants for pain management. Two took a codeine-based preparation which helped decrease their pain most of the time, although one felt the pain never went away entirely. This patient was reluctant to take increased or further analgesia due to polypharmacy. The third patient was taking multiple forms of analgesia, including Morphine tablets and liquid, an anti-epileptic for neuropathic pain and Paracetamol, but still experienced uncontrolled ulcer pain:

“…the medicine I’m taking is not touching me…”; “…If I could find a tablet or a medicine that could take it away just for a few hours, I’d be more than happy”.

He had previously overdosed on Oramorph in desperation to get rid of the pain, leaving him feeling ill for several days. When discussing a previous possibility of having the leg amputated due to a back condition and reduced circulation, he felt that at times amputation would be preferable to continuing in such pain from his ulcer:

“I suppose that’s the worst I can look forward to, but if it can get rid of that [pointing at the ulcer]…I know it sounds stupid…”.

He described restlessness at not getting any relief from the pain, describing himself as like ‘an animal in a cage’, stating he’d try anything to decrease the pain.
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Physical Effects of Pain
This theme was identified from patient comments regarding the effects of DFU pain on physical aspects of their daily life.

Problems with mobility due to pain were discussed by all participants, leading to feelings of loss of independence. One felt his pain was improving as his ulcer was beginning to heal – he was using a walking stick rather than a Zimmer frame, and commented that feelings of loss of control in his life had diminished as his mobility improved.

Another felt decreased mobility had the biggest effect on QoL. Already experiencing limited mobility, the ulcer pain now forced her to use a wheelchair. Footwear problems highlighted previously also had adverse effects.

Another participant identified walking as a dominant factor in increasing his ulcer pain, requiring an electric scooter outside the house and leaving him unable to drive.

Sleep was also altered due to DFU pain, particularly for one. He slept in a chair as he couldn’t tolerate the pressure of the duvet on his foot while in bed, but was awake for long periods during the night. Sleeping tablets were ineffective:

“I just move my foot like everybody else does in bed… and that’s it, bang, it wakes me up”; “…about half hour and I wake…”; “I’ve gone through the roof with smoking… every time I wake up I’ve got to have something to do…”.

He thought lack of sleep made him feel much worse, feeling he could cope much better generally if his sleep improved.

Another commented that pain affected her sleep, finding she needed daytime naps due to tiredness, but felt that analgesia taken at night helped. One participant felt ulcer pain did not specifically wake him during the night, but took sleeping tablets with his bedtime analgesia.

Pain had also led to the loss of a previously healthy appetite for one participant:

“Well, I’m not living. it’s as simple as that. I’ve got no appetite, I eat like a pigeon. I used to love my Sunday dinners, but the look of them makes me feel ill now”.

Coping, Support and Social Impact
This theme was derived from the patients’ accounts of the impact ulcer pain had on their relationship with family, friends and healthcare professionals, including the support they received and coping strategies they adopted.

All participants commented on the care received from various clinicians for their DFU and related pain. Two felt that healthcare professionals had provided them with good care and support, which helped them cope.

“…There was one nurse… she sat with me and gave me comfort. Now that is something that you cannot get with swallowing a pill”.

One felt psychological support wouldn’t have helped, as she felt she had adapted to living with pain. Neither felt there was anything clinicians could have done better.

Conversely, one participant was unhappy with the support he had received from his general practitioner and district nurses, in particular, feeling there was no encouragement with progress of the wound and they were always in a rush to leave. He did feel more supported by the DFU clinic that had referred him to a Pain Specialist whose interventions had provided some relief for a short while. He was, however, frustrated with delays in treatment.

Help and support from family members also enabled them to cope. One felt the support received from her daughter made a big difference to her daily life and with coping with the pain. She performed dressing changes, reminded her to take analgesia and performed housework. This, however, made the patient feel she was putting pressure on her daughter’s time.

Feeling a burden on their family was also identified by the other participants, with one commenting he and his wife had no retirement. Another also depended greatly on his wife, feeling that DFU pain and the limitations it placed on his mobility was impacting on his family relationships:

“...I’ve got a daughter nearby… I hardly see her.”; “I’ve got to the stage where I don’t want anybody… I mean I love having the grandkids up here but they can be noisy, and it makes me irritable”;

“I’ve got through the roof with smoking… every time I wake up I’ve got to have something to do…”.

He also felt unable to perform any household maintenance or previously enjoyed social activities, especially as there were steep steps outside his house:

“…I’m not in the mood, I just can’t be bothered. I’m sick of being in but I don’t want to do anything else”.

Another participant stated:

“I’ve just been like a zombie. With no interest. Now I’m beginning to get out a bit, I feel better. I want to go out more”.

All participants commented on the care received from various clinicians for their DFU and related pain. Two felt that healthcare professionals had provided them with good care and support, which helped them cope.

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Investigating the Impact of Topical Antimicrobials in Wound Care

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Wound infection is the most concerning of all wound complications. Topical antimicrobials play an important role in preventing and managing local wound infections however there are some outstanding questions regarding the usage of these agents that need to be answered.

The aim of this Symposium is to support the appropriate use of topical antimicrobial agents and to promote clinical decision-making that ensures their prescription only when clinically indicated.

The Chairmen Assoc Prof Bill McGuiness, Acting Head of School, Nursing and Midwifery, La Trobe University and AWMA President Australia, and Lt Col Steven Jeffery, Consultant Plastic Surgeon, The Royal Centre for Defence Medicine UK, will open and close the seminar by discussing commonly raised questions regarding using topical antimicrobials.

Professor Kevin Chipman, Professor of Cell Toxicology, University of Birmingham, UK, will give an overview of published safety data on topical antimicrobials.

Dr Paul Silverstein, Clinical Professor Plastic Surgery, University of Oklahoma, USA will discuss the importance of considering the health economic aspect in clinical studies in burn care.

Dr Jean-Charles Kerihuel, Medical Director and Consultant Physician & Methodologist, France, will reveal results from a large observational study using topical antimicrobial dressings in different wound types.

We look forward to seeing you there!
Psychological Impact
This theme concerns the patient’s emotions, including feelings of depression, isolation and loss of independence, which overlapped considerably with the other themes due to the wide impact of the pain overall.

Loss of motivation and feelings of depression due to ulcer pain were expressed by two participants:

“...the worst time I've got at the moment is getting out of bed in the morning. I need real willpower to go into the bathroom and dress”.

“I look out there now and think spring is coming, but what can I do? Nothing.”.

Feelings of isolation and loss of independence were also raised. One participant felt frustrated with the lack of relief from the pain and that the ulcer controlled his life.

Two participants did however express trying to cope with things by thinking more positively, especially one whose pain was slowly improving:

“There's a light at the end of the tunnel now”.

DISCUSSION
A larger, more diverse sample would have provided a richer data set and increased expression of views, but time constraints made it difficult to address this issue. It would have been interesting to learn the experience of patients with purely neuropathic ulceration to determine any differences in QoL issues. Data saturation was not achieved so the collected data may be lacking in diversity or consistency. However, the main aim was not to generate theory but to gain information and perspective of the lived experience of DFU pain.

Experience of Pain
The reported descriptions of pain are varied and intense in nature, similar to the results of the Short-Form McGill Pain Questionnaire18 used in phase one. Despite the common perception that neuropathy leads to painless ulcers, the patients were not surprised to be experiencing pain. Preconceptions often held by patients and clinicians regarding the pain experience need addressing if DFU pain is to be understood and adequately managed.

The causes of pain were similar to that reported by qualitative studies relating to DFU as a whole11,12, with pressure from footwear or bedding being recurrent themes. Pain at dressing change has been noted by other QoL studies relating to DFU as a whole11,12, with pressure from footwear or bedding being recurrent themes. Pain at dressing change is becoming a more prominent and researched area, more consideration needs to be given to treatment of DFU with the awareness that they can be painful.

Problems with footwear are commonly cited within the QoL research relating to both DFU and VLU, although not always necessarily related to pain. The dissatisfaction or difficulties expressed by two patients regarding finding appropriate footwear could be an important issue for future care. Appropriate footwear for patients with DFU is paramount due to the requirement for offloading to improve healing23,24,25. Use of appropriate orthoses can improve physical and mental functioning in diabetic patients26, reinforcing the requirements for an efficient and effective orthotic service within diabetic foot clinics to not only improve healing but also QoL. The adverse effect of footwear on DFU pain is a significant issue for any healthcare professional (HCP) involved in the management of DFU, which again requires raised awareness and consideration within service provision.

Participants reported varying efficacy of analgesia for controlling DFU pain. Whereas previous literature is mainly concerned with the under-use of analgesia or the fear of dependence by patients11,27, some findings here suggest DFU pain can be so severe and multi-factorial that oral analgesia alone may not be sufficient. The only temporary relief one patient experienced was following referral to a chronic pain specialist, yet until clinicians acknowledge that specific ulcer pain exists and is not necessarily of neuropathic origin, there may be minimal referrals to specialist services. Management of some DFU pain may require treatment such as nerve blocks, psychological support or complementary therapies. Further research into this area alone is necessary if DFU pain assessment and management is to become even adequate.

Physical Effects of Pain
The majority of research into chronic wounds and QoL suggests they impact significantly on physical aspects of daily life6,11,12,22,28,29,30. Qualitative work consistently highlights issues with mobility and sleep, the consequences of which appear far-reaching in terms of fatigue, loss of independence and social isolation.

Similar reports were found here, particularly with regard to mobility. Standing and walking even short distances was found to increase pain, which concurred with previous findings in both quantitative and qualitative
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Some patients with DFU report frustration at the enforced decrease in mobility due to the need to offload the foot, and state they would rather adopt risk-taking behaviours and accept the possible consequences to their physical health for an increase in their QoL. If pain, however, is the cause of reduced mobility, then this option may not be available, leaving patients feeling completely restricted and isolated and with few coping mechanisms on which to depend. Achieving ulcer healing may be the only way of returning to a more normal physical functioning, as described by one participant.

Sleep was an important issue for patients both in this study and previous works, leading to extreme fatigue and changes in mood. The patients seem to become trapped in a vicious circle whereby the consequence of one problem exacerbates another. Increased fatigue due to sleep deprivation leads to further decreased mobility, which increases fatigue further due to patients becoming lonely, isolated and lacking in energy and motivation.

The results reinforce the idea that the impact of physical restrictions from DFU pain has the same widespread effect on psychosocial well-being as other types of chronic wounds. This emphasises the need for a holistic approach in order to facilitate a better understanding of patients’ needs.

Coping, Support and Social Impact
The accounts of DFU pain causing increased dependence on others for assistance with simple daily activities is in accordance with general QOL studies into patients with DFU and VLU. This causes feelings of loss of control and loss of self, which can leave patients anxious, depressed and vulnerable. While supportive families are a common theme within this study and others, and recognised as invaluable by patients, it is common for patients to feel burdensome and guilty, placing unwanted restrictions on their loved ones, especially if partners are elderly and may not be in perfect health. These issues can affect relationships whereby patients feel a loss of their previous life and a change in their social role, as reflected by the comments of one subject regarding not being able to play with his grandchildren or wanting to socialise with other family and friends. These comments are again a recurring theme in other QoL literature on patients with chronic wounds, where fear of others knocking their wound and causing pain led to the avoidance of social or public situations. Again, a perpetual cycle may develop where decreased mobility and increased dependence leads to social isolation, leaving patients depressed and not wanting contact with others. One patient alluded to such feelings, mentioning he could not perform tasks related to the upkeep of his home, a restriction which may have left him with feelings of low self-worth due to his change of role within the family. These issues highlight the extent to which DFU pain can restrict individuals and compromise lives, so clinicians need to be aware of these feelings if they are to address all the needs of the patient.

Varying positive and negative relationships with HCPs were reported by patients. The literature suggests many patients with chronic wounds become disillusioned with their HCPs, feeling their personal experience is not being recognised, thus inhibiting freedom of expression, and that they are not provided with enough education or involvement in decision-making regarding their care. Others get frustrated with the inconsistency of treatment and develop a lack of confidence in their HCP’s. It has been suggested that clinicians become focused on treating illnesses rather than people, or on curing rather than helping patients to live and cope with chronic illness – this may be the case with the patient who felt ignored and that his clinicians never offered him encouragement or reassurance, but seemed only concerned with completing the task in hand (redressing the ulcer) as quickly as possible. The ulcer and its healing can become the sole focus of all interventions, and the clinician loses sight of the personal experience and caring perspective. This underlines the need for clinicians to develop effective interpersonal skills and consider psychosocial aspects to recognise individual needs. The aim should be to prevent or lessen the psychosocial implications of DFU pain in the same way as physical treatment. Support in the form of allowing patients to talk, providing comfort and information-giving were the factors which participants felt fostered good relationships with their HCPs and helped them to cope.

Psychological Impact
The psychological impact of DFU pain is a common thread running through all the themes already discussed – the experience of pain, physical restrictions and changes in relationships all led to feelings which created a change in psychosocial well-being. Several comments dealt solely with feelings of depression, loss of motivation and resignation at their situation and the effect it was having on their lives.

Increased anxiety and depression in patients with diabetes and foot ulcers has been documented. These feelings can be enhanced due to concern that ulcers will never heal and a fear for the future at the loss of hope over regaining any control over their lives. One patient commented that the ulcer and pain controlled him, leaving him without positive thoughts. Another expressed a loss of motivation to even get up and wash and dress, yet was concerned about being a burden on his carer and frustrated at his lack of independence. Fear of amputation and its linked to
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depression is often mentioned within the literature\textsuperscript{11,13}, yet the desperation and anxiety felt by one patient regarding the lack of relief from his DFU pain had led him to question if amputation would be the more preferable option. These issues underline the importance for clinicians to pay more than lip service to holistic and psychological care, especially with regard to patients experiencing DFU pain, if prevention and management of such severe emotions is to be achieved.

Some patients coped with the feelings surrounding their DFU pain and its impact on their lives by either resigning themselves to its existence and their need to adapt to it, or by trying to think positively rather than succumbing to negative feelings. Husband\textsuperscript{29} suggested after a period of adaptation and endurance of long-term ulceration patients may learn to shift the focus of their life away from the ulcer in order to cope with it. Small improvements in one patient’s ulcer pain may have enabled him to see a future without pain and a return to his old feelings of self. Either way, clinicians need to consider helping the patient to cope and adapt to potentially chronic conditions while also trying to address physical needs and ulcer healing.

Limitations to the study are acknowledged, such as the potential for poor external validity. Smaller than expected sample sizes were obtained, and were chosen from a specialist environment dealing with chronic and critically ill patients. Therefore, similar findings may not occur with a larger, less complex population, and it is possible observed effects were not independent of natural variation within the clinic. However, the study was purely exploratory and filled a void by providing interesting and valuable information on an under-researched area. The results act as a basis for future research and highlight the requirement for this work to be performed.

The presence of complications related to diabetes and other medical conditions within the sample could also raise the question as to the extent to which the views and experiences expressed were solely attributable to DFU pain. They could also incorporate the difficulties of living with foot ulcers or diabetes itself, or even just general ill-health. Attempts were made to overcome this through reading of a statement at the commencement of each interview reiterating the specific subject matter and study aims.

CONCLUSION

Overall, the results of the qualitative component of this study into DFU pain have confirmed that this under-recognised phenomenon can have detrimental physical and psychosocial effects. This has major implications for clinical practice in that it challenges current assessment practices and accentuates the need for clinicians to improve their understanding of DFU pain and its consequences in order to increase quality of care provision and ensure the holistic needs of patients are met.

Lloyd and Orchard\textsuperscript{35} considered that improvements in QoL have become a more accepted goal of medical care, in addition to the alleviation of physical symptoms, but it is still evident that advancements can be made with regard to psychosocial issues. External pressures such as limited time and resources within diabetic foot clinics may lead to QoL issues related to pain and other aspects of living with a foot ulcer being overlooked, as the physical challenge of the ulcer itself is prioritised. Clinicians need to consider

References

increased QoL as a measure of success as well as objective physical outcome measures, because while these are important, dealing with a chronic and progressive disease such as diabetes may mean that patients have to cope with such problems for long periods of time. More work into the effect of DFU pain on QoL may help to raise awareness and aid clinicians in the provision of holistic care that facilitates both physical and psychological well-being.

Implications for clinical practice
- Clinicians need to be more aware of the importance of providing psychosocial care in addition to focusing on ulcer healing.
- Collaborative working between diabetic foot specialists, wound care specialists, pain specialists and primary care teams could promote better assessment and management of DFU pain and its impact on QoL.
- Patients should be involved in decision-making regarding their treatment.

Further research
- Further qualitative work into the patient’s perspective on DFU pain could help clinicians to understand the relevance to diabetic foot care and to their own practice, and aid in meeting patient needs more completely.
- Quantitative work using formal HRQoL tools could provide interesting information and comparative data with other patient populations.
- The development of a tool incorporating the physical assessment of DFU pain in conjunction with a review of psychosocial issues might be a useful method of increasing awareness and improving dissemination of information.

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EWMA 2011
Stand # 57
Topical negative pressure in the treatment of deep sternal infection following cardiac surgery: Five year results of first-line application protocol

ABSTRACT

Aim: We sought to evaluate a five year single centre experience for the application of topical negative pressure therapy (TNP) as the first-line therapy in the treatment of deep sternal wound infection (DSWI) following cardiac surgery.

Methods: Prospective analysis of 50 consecutive patients (27 men, 23 women, mean age 67.8±9.2 years) who underwent first-line application of topical negative pressure for the treatment of deep sternal wound infection within a five year period (from September 2004 to September 2009). Clinical and wound care outcomes were evaluated, therapeutic failure rates, in-hospital and as well as the one year mortality of unified application protocol.

Results: During follow-up 4% of 30-day mortality, 8% of in-hospital mortality, and 14% of one year mortality (10% DSWI-related complication adjusted) were observed. The mean length of overall therapy reached 12.6±8.0 days including the mean of 5.4±2.5 revision/dressing changes within 38.1±14.6 days of the mean in-hospital stay. The sternal bone was stabilized in 94% of cases; various flaps were employed in covering of the residual soft tissue defect in 70% of patients. Treatment failed in 6% of all cases, 4% due to DSWI recurrence, and 2% due to necrosis of the advanced muscle flap. The risk of wire-related fistula was 14% during whole follow-up period.

Conclusion: TNP therapy is a reliable method for the treatment of DSWI following cardiac surgery. The primary application of TNP demonstrated a low risk of failure and a significant decrease in short- and mid-term mortality was observed.

INTRODUCTION

Deep sternal wound infection (DSWI) is one of the most serious complications of cardiac surgery performed through median sternotomy with predicted mortality ranging between 5 to 30%1. Despite well-described risk-related factors, improved antibiotic prophylaxis and aseptic methods, the incidence remains unchanged, varying from 1% to 5%2. The treatment strategies of DSWI is still challenging; it differs from one country to another, from one institution to another and even from one surgeon to another at the same department2.

METHODS

Between March 2002 to September 2009, 6009 median sternotomies were performed at our department as a primary access for heart surgery. DSWIs were diagnosed according to the guidelines of the Centre for Disease Control and Prevention (CDC, 3), DSWI occurred in 84 patients which represented an incidence rate of 1.39%. Fifty consecutive patients (59%) were primarily scheduled for the first-line application of topical negative pressure therapy (TNP) between September 2004 and September 2009. The detailed unified therapeutic protocol has been described previously4,5,6. The median sternotomy was completely released and all suture material removed during primary revision. After bacterial sampling, when two to three swabs were taken (subticular, and mediastinal tissue, sternal bone), the wound was repeatedly flushed out with tepid saline solution. Inherent surgical debridement included removing only clearly necrotic tissue and was performed with aid of a scalpel, surgical spoon, and low-voltage electrocautery. Hydro-surgical debridement using saline jet-powered device (Versajet™, Smith and Nephew, UK) has not been employed. Moreover, debridement on the mediastinal structures was done extremely gently to avoid the risk of severe bleeding from grafts or the right ventri-
If the bone mass was affected with osteomyelitis, it was removed with adherent sternocostal joints and costal cartilages. Emphasis was put on meticulous haemostasis throughout each debridement. Bleeding from the bone marrow was controlled with temporally placed bone wax, which was removed within next dressing changes. Surgical debridement with repetitive application of TNP (Vacuum-assisted closure™, KCI San Antonio, Tx, USA) was carried out every 48 hours until the wound bed was found to be free of infection, then the wound was covered by well-vascularised granulation tissue. When C-reactive protein levels dropped below 30 mg/l, then the chest was reclosed (Figure 1). Peri-procedural, wound care characteristics and clinical outcomes were recorded in a prospective manner. All patients had a one year follow-up for the evaluation of long-term morbidity and mortality, Kaplan-Meier actuarial analysis of survival was plotted. Approval of the local ethics committee was obtained for the protocol of the application of TNP to the open chest wound in 2004.

RESULTS

There were 27 males (54%) and 23 females (47%) with an average age 67.8±9.2, and BMI 29.9±5.3 kg/m². Detailed peri-operative characteristics including co-morbidities, surgical procedures and post-operative complications related to DSWI are summarized in Table 1. A total of 45 patients underwent coronary artery bypass grafting either as single procedure or in combination with valve surgery. In this subgroup of patients, 28 (63%) had diabetes and the internal thoracic artery (IMA) was taken down in 40 (89%). Unilateral IMA harvesting (80%) was done in pedicled fashion, whereas bilateral IMA harvesting (20%) was always performed without surrounding tissue as a skeletonized graft with maximal effort to spare the chest bone blood supply. The presentation of DSWI was delayed in average 16.1±14.2 days after the primary surgery, and twenty-three (46%) patients were re-admitted to the hospital due to DSWI despite an uneventful wound healing progress at the time of discharge. Gram positive strains were dominantly cultivated from swabs obtained from the infected wound site, particularly staphylococcal aureus and coagulase-negative staphylococcus (Graph 1). There was no significant difference in outcome based on etiological causative agent. Based on the protocol, mean length of primary therapy reached 10.8±7.9 days including mean of 5.0±2.1 number of dressing changes in average until the wound bed was free of infection. All dressing changes were performed in the operating theatre, every patient was given a general anaesthetic and relaxed to avoid right ventricle or graft injury caused by the sternal lamella margins. The cost of each surgical debridement and dressing changes were analysed. The expenditure was approximately 2000 CZK (77 €) for general anaesthesia, 900 CZK (35 €) for surgical debridement, and 2500 CZK (96 €) for dressing material and collecting canister. A calculated total cost per one dressing change reached 5400 CZK (208 €). Changes in laboratory inflammatory parameters characteristics

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**Table 1. Perioperative characteristics**

<table>
<thead>
<tr>
<th></th>
<th>TNP (n=50)</th>
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</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>67.8±9.2</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>29.9±5.3</td>
</tr>
<tr>
<td>Male/female ratio (%)</td>
<td>54.0/46.0</td>
</tr>
<tr>
<td>DM (%)</td>
<td>58.0</td>
</tr>
<tr>
<td>COPD (%)</td>
<td>34.0</td>
</tr>
<tr>
<td>Immunosuppressive therapy (%)</td>
<td>18.0</td>
</tr>
<tr>
<td>Renal impairment (creatinin &gt; 120 mmol/l) (%)</td>
<td>28.0</td>
</tr>
<tr>
<td>LVEF (%)</td>
<td>40.8±13.6</td>
</tr>
<tr>
<td>EuroSCORE log</td>
<td>6.9±6.2</td>
</tr>
<tr>
<td>CABG/valve/combined procedure (%)</td>
<td>60/10/30</td>
</tr>
<tr>
<td>Mean operation time (min)</td>
<td>230.5±44.8</td>
</tr>
<tr>
<td>Mean XC time (min)</td>
<td>62.8±45.6</td>
</tr>
<tr>
<td>Mean ECC time (min)</td>
<td>90.7±40.1</td>
</tr>
<tr>
<td>Emergency surgery (%)</td>
<td>24.0</td>
</tr>
<tr>
<td>Postoperative blood loss (ml)</td>
<td>910±540.3</td>
</tr>
<tr>
<td>Mean artificial pulmonary ventilation (hours)</td>
<td>19.4±28.1</td>
</tr>
<tr>
<td>Mean ICU stay (hours)</td>
<td>61.1±34.8</td>
</tr>
<tr>
<td>Revision for bleeding/tamponade (%)</td>
<td>18.0</td>
</tr>
<tr>
<td>Revision for sternal instability (%)</td>
<td>40.0</td>
</tr>
<tr>
<td>Prolonged mechanical ventilation/tracheostomy (%)</td>
<td>8.0</td>
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</tbody>
</table>

**Abbreviations:**
- BMI – body mass index
- DM – diabetes mellitus
- COPD – chronic obstructive pulmonary disease
- LVEF – left ventricle ejection fraction
- CABG – coronary artery bypass grafting
- XC – cross clamp
- ECC – extracorporeal circulation
- ICU – intensive care unit

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**Graph 1. Predominant wound microorganisms**
(C-reactive protein, white blood count) throughout the therapy are displayed in Graph 2. The sternum was approximated in 47 patients (94%), and residual soft tissue defect needed to be covered with local flaps in 45 patients (70%). Detail of employed flaps is showed in Graph 3. Primary treatment failed in three patients (6%); in two patients (4%) due to DSWI recurrence, and in one (2%) due to necrosis of bipedicle muscle flap owing to the technical failure. All those patients underwent TNP therapy according to the therapeutic protocol similar to primary application (rescue therapy), and the necrotic flap was removed. Furthermore, superficial sternal wound infection (SSWI) or soft tissue dehiscence occurred in four patients (8%) which was treated with moist healing therapy and/or was surgically closed. Mean overall length of TNP therapy reached 12.6±8.0 days including 5.4±2.5 dressing changes on average, mean in-hospital time was 38.1±14.6 days.

Focusing on the mortality, 4% of 30-day mortality (two patients), and 8% of in-hospital mortality (four patients) was recorded ranging between the 9th-94th post-operative day. Three patients (6%) died of multiple organ failure and one (2%) of intractable bleeding from a right ventricle rupture that occurred shortly after the primary revision. Detailed therapy characteristics and clinical outcomes are recorded in table 2. During the one year follow-up, a total of seven patients (14%) were lost, five of whom (10%) were an immediate consequence of DSWI (DSWI adjusted mortality), another seven patients (14%) underwent treatment for wire-related fistula. The one year plotted survival analysis using Kaplan-Meier analysis is displayed in Figure 2.

DISCUSSION
The treatment of DSWI poses an ongoing challenge for cardiac surgeons; thus far there is no consensus about the standard of care covering this issue\textsuperscript{2}. TNP therapy has been used in cardiac surgery since 1997. Despite growing and encouraging experience, evidence that TNP is better than conventional therapy is still lacking\textsuperscript{4}. Several studies comparing TNP versus conventional therapy showed superiority of TNP in terms of reduction of primary therapy failure, short- and long-term mortality and morbidity, and better quality of life, however, all had retrospective design and were conducted on a limited number of patients\textsuperscript{5,6,7,8}. Recently initial data showed the cost-effectiveness of this therapy\textsuperscript{9}. Even though the cost of TNP was comparable with other treatment strategies of DSWI, this treatment brought a significant reduction in mortality and in-hospital stay\textsuperscript{9}. Thus, there is still essential need for further investigations including larger prospective multi-centre study, and randomized trials\textsuperscript{4}. From a surgical point of view, TNP combines advantages of the open therapy which enables repetitive debridement and wound drainage with the closed therapy, because even in the absence of sternal closure, applied negative pressure of 125 mm Hg effectively stabilizes the chest. It allows immediate postoperative extubation and mobilization of the patient. Moreover, sealing the sternal wound minimizes the risk of secondary contamination and facilitates handling with patients, particularly if they need to be hospitalized in the ICU\textsuperscript{10}.

The exact mechanism of TNP action on wound healing has not been fully explained as yet\textsuperscript{10}. It has been shown to accelerate granulation tissue building, reduce wound surface area, decrease local and interstitial tissue oedema, and increase perfusion of the peri- and wound area\textsuperscript{10,11,12} even when the left internal mammary artery has been harvested for bypass grafting\textsuperscript{13}. Moreover, diminished bacterial load or modulation of bacterial species together with the reduction of the amount of metalloproteinase detected in the wound bed strongly suggest that the effect of TNP on wound healing processes is rather more fundamental than adjunct\textsuperscript{14,15}.

A new negative pressure therapy (V.A.C – Instillation™, KCI, San Antonio, TX, USA) has been recently introduced. It combines the positive effect of sub atmospheric pressure with intermittent instillation of antiseptic solution. This therapy demonstrated its effectiveness in the treatment of chronic-infected wounds such as pelvic and leg post-traumatic osteomyelitis. Applied negative pressures together with intermittent instillation of polyhexanide solution significantly reduced total in-hospital stay (36 vs. 73 days, p<0.0001) and recurrence of infection (3% vs.59%, p<0.0001) compared with conventional treatment\textsuperscript{16}.
Although the manufacturer’s recommended negative pressure setting is 125 mmHg for polyurethane foam, and 150 mmHg for polyvinyl alcohol foam, some of the studies that focused on cutaneous blood flow suggested that further increase in sub-atmospheric pressure, even up to 300 mmHg, leads to a three times increase of cutaneous blood flow for polyvinyl alcohol and five times for polyurethane foam.

The aim of this prospective study was to evaluate the clinical outcome of first-line application of TNP for DSWI as a standard of care. The results suggested that TNP therapy is associated with low rates of therapy failure, and reduction in short- and mid-term mortality. Uniform treatment protocol allowed for equivalent outcomes to be achieved among all surgeons at one unit.

<table>
<thead>
<tr>
<th>Table 2. Therapy characteristics and outcomes</th>
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<tbody>
<tr>
<td>Primary therapy</td>
</tr>
<tr>
<td>No. of revisions/dressing changes</td>
</tr>
<tr>
<td>Length of primary therapy (days)</td>
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<tr>
<td>Failure of primary therapy (%)</td>
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<tr>
<td>Complications after the chest closure</td>
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<tr>
<td>DSWI (%)</td>
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<tr>
<td>Flap necrosis (%)</td>
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<tr>
<td>SSWI/dehiscence (%)</td>
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<tr>
<td>Fistula (%)</td>
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<tr>
<td>Overall therapy</td>
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<tr>
<td>Overall length of therapy (days)</td>
</tr>
<tr>
<td>Overall No. of revision/dressing changes</td>
</tr>
<tr>
<td>In-ICU stay (hours)</td>
</tr>
<tr>
<td>In-hospital stay (days)</td>
</tr>
<tr>
<td>Mortality</td>
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<tr>
<td>30-day mortality (%)</td>
</tr>
<tr>
<td>In-hospital mortality (%)</td>
</tr>
<tr>
<td>Multiple organ failure (%)</td>
</tr>
<tr>
<td>Intractable bleeding (%)</td>
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<tr>
<td>1-year mortality (%)</td>
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</table>

ICU – intensive care unit

CONCLUSION

TNP therapy is a safe method for the treatment of DSWI following cardiac surgery. The first-line application protocol of TNP demonstrated a low risk of failure and a significant decrease in short- and mid-term mortality was observed.

Implications for Clinical Practice

- TNP is an effective treatment for deep sternal infection after cardiac surgery
- TNP is associated with low failure rate, and reduced short- and mid-term mortality
- TNP should be widely accepted as a first-line treatment strategy for DSWI in cardiac surgery

Further Research

- Multi-centre prospective randomized trials comparing TNP with the conventional therapy need to be undertaken
- Influences of individual wound-healing risk factors and microbiological agents on the effectiveness of TNP therapy need to be examined
PRIMARY WOUND DRESSING

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BACKGROUND
The Wounds Research for Patient Benefit (WRPB) programme commenced in 2008 and will receive £1.75 million of funding from the Programme Grants for Applied Research funding stream of the National Institute for Health Research (NIHR), over five years. The research programme is a multidisciplinary collaboration between NHS Leeds Community Healthcare and the University of York. The large and diverse population of Leeds offers an ideal laboratory for research, ensuring the delivery of useful and valid information regarding complex wound care and the University of York is home to the Wounds Research Group which has an international reputation for its expertise in a range of research methodologies applied to wound care.

The WRPB programme is specifically focused on researching complex wounds which we define as wounds which involve superficial, partial or full thickness skin loss and which are healing by secondary intention. They are wounds with an underlying cause or which occur in patients where underlying disease may impact upon healing e.g. pressure ulcers, leg ulcers and dehisced surgical wounds. Currently good information regarding the nature, treatment, costs and outcomes for people with complex wounds is very limited and this research programme will plug some of these knowledge gaps, reduce clinical uncertainty and enable decision makers to prioritise future research and areas for service development. We wanted to take this opportunity to provide an overview of the work that is being carried out as part of this programme and to invite you to share your clinical uncertainties with us.

The research programme is split into three distinct, but integrated workstreams which we will describe in turn.

WORKSTREAM 1:
Data capture and epidemiology
Workstream 1 is focused on collecting high quality information about complex wounds and their care. There is a real lack of basic, yet important, information about the treatment of complex wounds in the UK; a fact we have confirmed in a recently completed literature review of wound prevalence surveys/audits. Whilst we included fifty studies in the review, problems of study design meant that many of these studies were at high risk of bias and likely to under- or over-estimate wound prevalence. These biases result in large differences in the published estimates of complex wound prevalence. Our literature review helped inform the design of a new large and comprehensive survey of people with complex wounds in Leeds. The survey took place over a two-week period in March 2011 and included all settings in which people with complex wounds are treated including health clinics for people with no fixed abode and prisons. This comprehensive data collection and the inclusion of hard-to-reach groups such as IV drug users mean that we are confident in the results and the estimate of wound prevalence this study will bring. This survey also recorded who is delivering health care, how often and what treatments are being provided so we will have important new insights into the impact of wounds on all health care services. Data are currently being analysed and will be published late 2011.
Finally, within this workstream we are exploring whether we can routinely collect high quality data about people with complex wounds, for use in both service planning and research. Such a system, a type of register, would record the number of patients affected; the ongoing impact of wounds on quality of life; actual treatments received and healing rates achieved. Additionally, such a system could facilitate on-going assessment of costs and benefits, as well as monitoring the diffusion of new-to-market medical devices into practice. Such data will contribute to health technology assessment via the tentative application of advance methodologies that may generate information on the clinical and cost effectiveness of wound treatments. This work is on-going and more information about this and all aspects of workstream 1 can be found at: www.york.ac.uk/healthsciences/wounds-patientbenefit/wone/

**WORKSTREAM 2:**

**Understanding what matters most to patients, carers and health professionals in complex wound care**

Workstream two acknowledges that those researching and delivering wound care should fully understand what outcomes matter most to patients and carers. Wound healing is frequently reported in trials, whilst some have argued for alternative outcomes\(^1\), so we are asking patients and clinicians. Other possible outcomes of interest could include debridement, the number of dressing changes, resource use, exudate, odour, pain, dressing comfort and product durability. To find out we are undertaking in-depth interviews with patients, carers and health care staff about the relative importance of different wound treatment outcomes to them. The study includes patients who have leg ulcers, diabetic foot ulcers, pressure ulcers and dehisced surgical wounds and the findings will provide missing information for researchers and health care staff on what matters most to different patients experiencing wound care. Additionally, in collaboration with the James Lind alliance (JLA)\(^2\), we are convening groups of patients, carers and citizens who are interested in helping to set the research agenda for the treatment specific wounds.

The JLA was established in 2004 to encourage patients, carers and clinicians to work together to identify and prioritise important healthcare uncertainties that can be translated into research priorities. Where there is no clear evidence about the effectiveness of treatments, clinicians and patients are left with uncertainty and are reliant on the opinions of health care professionals which can be flawed. In our experience public involvement in, and awareness of, wounds research is minimal. Given the lack of patient involvement in research agenda setting and the limited evidence-base informing clinical decisions in wound care\(^3\)-\(^5\), the JLA is supporting the development of a partnership of patients, carers and clinicians to identify research priorities in the prevention and management of pressure ulcers. The objective is to discover the research questions that matter most to stakeholders. The initial meeting of the James Lind Alliance Pressure Ulcer Partnership (JLAPUP) took place in York in Spring 2011 and was participated in with much enthusiasm by delegates. Further information on the JLAPUP can be found at www.york.ac.uk/healthsciences/wounds-patientbenefit/jla-pressureulcerpartnership/
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WORKSTREAM 3: Evidence synthesis

Workstream 3 brings together existing research to answer questions about which wound treatments work best. In order that our reviews tackle questions of high priority to the NHS, we consulted with clinicians, including nurses and podiatrists and compiled a list of 27 potential questions which can be viewed on our website (www.york.ac.uk/healthsciences/wounds-patientbenefit/wthree). Questions included: What is the relationship between debridement and healing in foot ulcers and other complex/chronic wounds? and What is the best way to diagnose osteomyelitis?

For each topic we have scoped the literature in order to identify existing summaries of research and we have noted those topics that seem ‘ripe’ for further investigation. It is important to note that this list is not closed and we welcome further suggestions from readers of this journal (please submit suggestions via our Programme website or by contacting Susan O’Meara, susan.omeara@york.ac.uk). The main focus here is clinical effectiveness questions (i.e., those that explore how well an intervention works) or what the most accurate method of diagnosis is.

Our consultation with clinicians has resulted in us initiating a new review on dressings for healing diabetic foot ulcers where we are using a more sophisticated method of evidence synthesis (mixed treatment comparison) to make the most of existing published data.6-8 We are also working on updating existing Cochrane reviews in wound care. We have completed one update (Antibiotics and antiseptics for venous leg ulcers5) and another (Compression for venous leg ulcers) is underway. We also have a new review in progress which explores the influence of the type of research funding on the quality of wound treatment trials. Additional new reviews and review updates will be undertaken as the research programme progresses. A further component of this Workstream will investigate how we might best present the results of evidence synthesis, including quantitative information and uncertainty, to make them most useful for health professionals.

CONCLUSIONS

Good clinical management of complex wounds promotes positive outcomes and reduces wound recurrence. The lack of good quality research evidence for wound treatments should concern us all — only approximately 10% of recommendations in National institute of Health and Clinical Excellence and the Royal Collage of Nursing wound care guidelines are supported by Level 1 evidence. The Wound Research for Patient Benefit research programme is encouraging the production of more relevant and better quality research evidence on the effectiveness and cost-effectiveness of wound prevention and treatment. This evidence has the potential to improve the quality of care, patient outcomes and reduce costs. If you wish to contribute to discussion on treatment uncertainties or have any other wound care-related research questions please contact us via our website: www.york.ac.uk/healthsciences/wounds-patientbenefit/research-question/

Disclaimer

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The Belgian Federation of Woundcare (BEFEWO) was established in 2004 as the umbrella organisation of two major wound management associations in Belgium. Belgium is a bilingual country where both French and Flemish (Dutch) are spoken. The two wound management associations existing at that time were CNC Wound Management Association and AFISCeP. An outcome of this joint partnership was the Belgian National Bilingual wound management conference in 2006 in Brussels. The success of this initiative has now resulted in an annual BEFEWO conference with over 450 participants each year. In 2011 the BEFEWO conference will be held during the EWMA conference at the SQUARE in Brussels. It is a great privilege in 2011 for BEFEWO to host EWMA’s conference in Brussels, the European Capital, as it is also the fifth anniversary of the Belgian Bilingual National Conference.

The organisations not only collaborate with conferences but also in relation to liaising with the Belgian Government. Here the organisations undertake common initiatives and represent each other as BEFEWO members in diverse international organisations as EWMA, ECET, EPUAP and ETRS. BEFEWO is a joint organisation representing the strength, multilingualism and unity of Belgium and its wound management associations. Besides the interest in wound management both organisations have a specific interest in ostomy care which is closely combined with wound management in Belgium.
April 2011. This is a new initiative on which there hopefully will be a lot of focus in the future.

Since 2000 an annual Flemish wound symposium has been organised and in 2008 the symposium became the Flemish Wound Management Conference. Held in Kortrijk with its mirror symposium in Hasselt –Genk the conference annually attracts over 700 doctors and nurses to attend.

Besides education and promotion of wound management, CNC WMA believes in collaboration between organisations to promote wound care issues. CNC WMA collaborates with NVKVV (Nationaal Verbond van Katholieke Vlaamse Verpleegkundigen) Flanders, a major Nurses organisation, regarding a joint membership at reduced annual fee opportunity; with VLAS, the Flemish ostomy organisation, regarding educational activities and also with a steering committee of 21 local wound management companies to establish better education and awareness towards wound-care in Belgium.

In 2001, CNC WMA started a preliminary UCM (University Conference Model) concept at the EWMA conference for its postgraduate students. Since then CNC WMA has been proud to be able to send students to the conference each year.

In 2011 the updated website, www.woundcare.be, will be launched which is a reference for Flemish students and nurses seeking comprehensive and accessible information concerning wound management. Together with the paper version wondzorg.be this is the major reference source for the Flemish nurses and doctors.

Nearly twenty years ago an association named ARIAS was established. This association handled the distribution of information regarding ostomised patients to nurses and attending doctors etc. for the more professional treatment of ostomised patients.

Five years later ABISCEP was established with the intention to train stoma therapy nurses in Belgium. Over time, this association expanded into wound care and healing.

In 2007, these two francophone associations joined together under one name: AFISCeP.be.

This association is very active. It organizes an annual conference and roundtable meeting. In addition, some members are responsible for informing home care providers and future nurses in schools. It participates in the INAMI (Institut National Assurance Maladie Invalidité – National Institute for Disability Health Insurance) work group and defends patients for the reimbursement of equipment used in stoma care. The association works for the recognition of stoma therapy nurses and nurses specializing in wound care. In addition, AFISCeP.be also organises supplementary training events for certified stoma therapy nurses.

An additional project was a 900 hour stoma therapy and wound care training course that was organised to meet the Belgian legislation in the field. Our association works with CNC WMA to organise the BEFEWO conference which bring together the French and Flemish communities.

To support and complement its activities the AFISCeP.be publishes a quality journal twice a year that is respected and valued by all professionals. Its website, www.afiscep.be, also keeps members up-to-date on the latest news in the field. These projects all contribute to the dissemination of information and training to maintain a high skill level of caregivers in patient support and care.
Patient Outcome Group (POG) is currently working on disseminating the messages formulated in the POG document "Outcomes in controlled and comparative studies on non-healing wounds – Recommendations to improve quality of evidence in wound management".

POG is currently initiating several projects to meet the general objectives:

1. **Identify barriers:**
   - With a starting point in the current debate on evidence in wound healing and the Cochrane levels of evidence, the group will define the primary barriers (as experienced by clinicians and companies) related to the creation and implementation of evidence-based guidelines in wound healing.

2. **Propose guidelines for clinical data collection:**
   - The objective will be to define how existing guidelines for clinical trials (e.g. RCTs or more “practical” studies (real life studies etc.)) can be adapted to wound management, by including, for example, other end points such as number of dressing changes, health economics, QOL, education of staff and structure of treatment.

3. **Participate in the public debate / policy making:**
   - The working group should present a common viewpoint on clinical trials of wound management products in relation to the debate on both national and European levels. A primary goal will be to influence the decision making processes concerning approval and reimbursement of wound management products. EWMA will act as shareholder and work to influence the national agendas in order to put chronic wounds on the agenda.
   - A central European HTA unit is assumed to be established. The working group should approach involved institutions in order to present the work and conclusions of the group in relation to evidence in HTA of wound management products.

4. **Create and implement consensus:**
   - Other interested parties (clinicians, companies, reimbursement authorities, European collaborative groups and institutions) should be involved in order to establish consensus within the area. A pan-European consensus with a national implementation strategy has been proposed.

POG conducted a Health Economics Course in Copenhagen which can be read about elsewhere in this Journal edition. Furthermore, the group is currently preparing EWMA Industry Course to be held on October 13-14th, 2011 in Budapest. The group is also working on translating the essential document into German and French in order to spread the messages of the work. Currently there is a Polish translation of the document, which is available on the website.

Furthermore, the group is continuing to disseminate the messages of the POG document by addressing relevant concerns to the authorities in the EU and member states in order to enhance research in wound care and, in turn, create a better treatment of wounds for patients all over Europe.

**POG currently consists of:**

**Clinical:**
- Patricia Price, Chair (EWMA Council)
- Jan Apelqvist (EWMA Council)
- Finn Gottrup
- Luc Gryson (EWMA Council)
- Hugo Partsch
- Robert Strohal (EWMA Council)

**Industry:**
- Abbott Nutrition, B Braun, Convatec
- Lohmann and Rauscher, Mölnlycke

For further information about EWMA Patient Outcome Group, please visit ewma.org/english/patient-outcome-group.html. Any questions concerning Patient Outcome Group or the document can be sent to EWMA Secretariat:
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EWMA and the EWMA Patient Outcome Group introduce the EWMA Industry Courses 2011.

The two courses are held over two days. One course focuses on Evidence and Outcome and the other focuses on Health Economics.

The courses are primarily targeted at industry representatives, but will also be of relevance to clinicians and others interested in research and wound care economics.

13-14 October 2011
Generating Evidence in wound care

The course aims to give an introduction to clinical trials in addition to the use of alternative end points and outcomes in wound care. The course will provide the participants with an understanding of what the essential considerations and limitations are when conducting research in wound care. Furthermore, the participants will be provided with the necessary information on how to conduct evidence based research in wound care, taking the right measures into consideration.

13-14 October 2011
Health Economics

This course aims to give an introduction to health economics and evaluation as applied to wound care. The course will provide the participants with an understanding of how to evaluate the economic benefits and challenges in prevention, diagnosis and treatment. The participants will acquire basic knowledge about economic analysis and training in the tools of how to conduct economic evaluation. The entry point is wound care, but the principles are general.

For more information and registration please visit www.ewma.org/industrycourse
Facilitated by the internationally recognised health economist John Posnett, the course took place on 7-8 April 2011 in Copenhagen, Denmark. The course was considered a pilot for future similar courses with the next EWMA Health Economics Course scheduled to take place in Budapest on 13-14 October 2011.

The main objective of the course is to provide training in health economics principles and health economics analysis applied in wound care. Participants are, among other things, introduced to methods of how to elaborate and present arguments on modern wound care products and the organization of the treatment.

Learning objectives:
- To understand why an economic approach to wound care is essential for both clinicians and for the industry in the face of demographic and technological trends;
- To understand how to demonstrate the value of good treatment to senior managers and other decision-makers, through audit and other forms of observational research;
- To learn how to undertake or to interpret the results of economic evaluations of healthcare interventions.

Feedback and evaluation by course participants
The course attracted a mixed group of 30 participants including international clinicians (physicians and nurses), industry representatives and EWMA Council members.

The following feedback is based on the responses to an online evaluation questionnaire after the course.
- 100% of the respondents expressed that the course had met their expectations
- 100% of the respondents would recommend the course to others.
- The social & networking aspects of participation in the course were considered relevant by all participants.

Background for the course and content
The EWMA Health Economics Course is a new activity under the auspices of the EWMA Patient Outcome Group (POG).

Meeting the objectives of EWMA POG, focus on the need for knowledge about health economics is increasing due to the changing demographics and the continuing rise in the cost of health care provision across Europe.

Health Economics is based on the concept of scarcity, which suggests that there will never be sufficient resources to meet the ever growing need for health care by society. Thus, the underlying premise is that the delivery of health care should be founded on equity and efficiency; in other words, making the best use of the resources available (Phillips 2005).

EWMA wants to contribute to maintain focus on the severe costs of wounds, thereby strengthening the importance of wound care investments in order to improve conditions for patients.

Further information about the next EWMA Health Economy Course is available at: www.ewma.org/industrycourse

References

Finn Gottrup
MD, DMSci
Professor of Surgery, Former Chair of the EWMA Patient Outcome Group
INTRODUCTION
The Eucomed AWCS group (www.eucomed.org) was founded back in June 2007, and since then we have had sixteen regular meetings. At present there are eight companies in the group: B. Braun, Covidien, ConvaTec, KCI, Mölnlycke Health Care, Paul Hartmann, Smith & Nephew and 3M. In addition, we also work in active partnership with EWMA and Policy Action.

The purpose of this paper is to give an update of our activities during the latest nine months, from July 2010 to March 2011.

STATUS REPORT
Questionnaire about Patient Safety sent out by the European Commission to the Member States

With short notice, the AWCS group together with EWMA was offered an opportunity to contribute to a questionnaire that was being finalized by the European Commission. This questionnaire, about Patient Safety, was sent by the Commission to the Member States by the end of March 2011. The purpose of the exercise was to support the European Commission in its review of the Council Recommendation on Patient Safety (approved June 2009). Our recommendation ended up in nine distinct questions. Please see below for a list of the questions posed. While it is not certain that any questions submitted to the EC will in fact be used in the questionnaire for the Member States, the engagement alerts the Commission to AWCS/EWMA’s interest in this dossier and provides an avenue for future discussions with the Commission – particularly regarding the use of adequate wound care treatment to increase the patient safety.

Eucomed AWCS (Advanced Wound Care Sector)
The 16th Eucomed AWCS meeting took place on 17-18 January 2011 at the B.Braun offices in Paris, commensurate with the CPC. This was a 1½ day session with a goal & strategy meeting followed by a normal meeting. The budget for the year 2011 will be €30,000 which means €5,000 per company. The priorities of the group during 2011 will be:

- The European Commission AHAIP (Active and Healthy Ageing Innovation Partnership), knowing that diabetes is a chronic disease with a hidden potential for DFUs and thus a public health issue.

EC Patient Safety Questionnaire to Member States

The European Wound Management Association (EWMA) and the Eucomed based Advanced Wound Care Sector Group (AWCS) recommends to the European Commission that the following questions be incorporated into the planned questionnaire sent to member states on Patient safety.

1. Does the member state have in place guidelines for diagnosis and effective treatment of chronic/non-healing wounds?
   Yes/no: ___
   If yes, which programmes/policies/quality measures are in place (home-care or hospital targeted)? ___

2. Do national targets exist for the prevention of wounds?
   Yes/no: ___
   • Pressure ulcers (tfc x): __
   • Leg ulcers: ___ 
   • Diabetic foot ulcers: ___
   • Healthcare associated infections in wounds: ___
   If yes, which programmes/policies/performance parameters/quality measures are in place? (please elaborate below): homecare or hospital targeted? ___

3. Do national targets exist for education and training specific to wound care and prevention with regards to adverse events, hereunder health care workers specialisation in wound prevention and treatment?
   Yes/no: ___
   • Pressure ulcers (tfc x): __
   • Leg ulcers: ___ 
   • Diabetic foot ulcers: ___
   • Healthcare associated infections in wounds: ___
   If yes, which programmes/policies/performance parameters/quality measures are in place? (please elaborate below): homecare or hospital targeted? ___
- “Patient Safety”, continue to be involved with this campaign through the risk of wound infections.
- “Continue the dialogue with national associations: SDMA and ABHI (UK), BvMed (Germany), Appamed (France), Assobiomedica (Italy) and Fenin (Spain).
- Work in active partnership with Policy Action and EWMA including the POG (Patient Outcomes Group).

Wound Care contribution to the European Commission campaign on ‘Active and Healthy Ageing’

Based on the EU2020 strategy for a smart, sustainable and inclusive Europe, the European Commission (EC) in October 2010 launched the Innovation Union Strategy. A key pillar of that strategy is the pilot Innovation Partnership on Active and Healthy Ageing. Eucomed answered to the EU public consultation by providing four proposals to the ‘Active and Healthy Ageing Partnership’ which revolve around:

1. Developing procurement systems that focus on procuring innovation. The UK and Sweden have developed new approaches around this objective.
2. Facilitating research on the parameters that influence national and local procurement decisions.
3. Reducing risks and hospitalisation of people with cardiac problems. Raising awareness of the benefits of remote monitoring of cardiac devices and develop appropriate funding schemes.
4. Avoiding hospitalisation of people through effective community care in the areas of stoma, wounds and incontinence, conditions that have high prevalence in people with any chronic conditions.

Today, the medical technology industry is faced with a number of innovation hurdles which limit its potential to contribute to a smart, sustainable and inclusive economy, ranging from limited end-user involvement, through patchy adoption of novel technology, to a lack of harmonisation in funding and reimbursement practices across the member states. Eucomed is of the opinion that, in partnership with other stakeholders, these innovation barriers can be overcome, thus contributing to the three goals the EC has set out for itself with this pilot partnership:

1. Enabling EU citizens to lead healthy, active and independent lives while ageing;
2. Improving the sustainability and efficiency of social and health care systems;
3. Boosting and improving the competitiveness of the markets for innovative products and services, responding to the ageing challenge at both EU and global level, thus creating new opportunities for businesses.

Eucomed MedTech Forum

On 12-14 October 2010, the annual Eucomed MedTech Forum, organized under the patronage of Mr John Dalli, EU Health Commissioner, took place in Brussels. The theme this year was “Europe 2020: Driving the innovation agenda” and the highlight of the event was a CEO Summit. The forum attracted over 350 leaders from policy and scientific communities, along with the medical technology industry. The mission of Eucomed (www.eucomed.be) is to improve patient and clinician access to modern, innovative and reliable medical technology.

The CEO Summit welcomed representatives from both global and European industry leaders. In the first panel we saw:
- Alex Gorski, Worldwide Chairman, Medical Devices and Diagnostics Group, Johnson & Johnson
- Pierre Guyot, CEO Mölnlycke Health Care
- Srini Seshadri, President, Smiths Medical

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### 4. Do national targets exist for the multidisciplinary approach to treatment and prevention of wounds?

<table>
<thead>
<tr>
<th>Yes/no</th>
<th>Pressure ulcers (tic x):</th>
<th>Leg ulcers:</th>
<th>Diabetic foot ulcers:</th>
<th>Healthcare associated infections in wounds:</th>
</tr>
</thead>
</table>

If yes, which programmes/policies/performance parameters/quality measures are in place? (please elaborate below): homecare or hospital targeted?

### 5. Does national targets/procedures/regulation exist for avoiding delay for patient treatment, hereunder organisation of treatments (e.g. clinical pathways)?

<table>
<thead>
<tr>
<th>Yes/no</th>
<th>Pressure ulcers (tic x):</th>
<th>Diabetic foot ulcers:</th>
<th>Healthcare associated infections in wounds:</th>
</tr>
</thead>
</table>

If yes, which programmes/policies/performance parameters/quality measures are in place? (please elaborate below): homecare or hospital targeted?

### 6. Does national standardisation exist for wound care, hereunder national quality measures?

<table>
<thead>
<tr>
<th>Yes/no</th>
<th>Pressure ulcers (tic x):</th>
<th>Leg ulcers:</th>
<th>Diabetic foot ulcers:</th>
<th>Healthcare associated infections in wounds:</th>
</tr>
</thead>
</table>

If yes, which programmes/policies/performance parameters/quality measures are in place? (please elaborate below): homecare or hospital targeted?

### 7a. If data collection on wounds are in place which is collected and how is it reported?

- Incidence: __________  •  Prevalence: __________  •  Costs: __________

If yes, how is it reported? Which measures for exhaustive collection has been taken and how is it reported (e.g. clinical and/or research based collection, national/local)?

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**EWMA**
The speakers gave a description of what they think the world will look like in five years and what it means for the industry and for its customers in terms of change. In his speech, Pierre Guyot started with an introduction of Mölnlycke Health Care, then continued with describing today’s challenges for the medtech industry in general, and finally asked how Europe can help to create a more innovative industry climate. The focal point of his presentation was on the coming shift from hospital care to community & homecare, and how government policy could help or hinder this change.

The complete presentations from the MedTech Forum can be found here, (www.eucomed.be/Home/portal/mtf2010_presentations/mtf_presentations.aspx)

IHE Forum (Swedish Institute of Health Economics)
This year’s annual conference took place in Lund on 2-3 September 2010, with the theme “How can we promote innovations in healthcare?”. There were many interesting speeches from different angles including "Innovation – what is that and how does it influence economic growth?", "Purchase of innovations", and “Value Based Pricing – To set the price on value or cost?”

Everyone agreed that innovations are necessary for society to grow and develop, but still public payers (government, county councils and municipalities) are reluctant to buy new innovative products. The reason for that is the care providers’ conservative idea of seeing their main goal as the care of patients and not as bringing in innovations in the healthcare process. Therefore we must apply a holistic view of health and social care. In the end it is all about customer benefits, in terms of utility for the patients, caregivers and relatives, but also in services and efficiency in the process and organization around the patient.

8. Do national targets exist for research support on chronic/non-healing wounds?
   Yes/no: ___ • Pressure ulcers (tic x): ___
   • Leg ulcers: ___ • Diabetic foot ulcers: ___
   • Healthcare associated infections in wounds: ___
   If yes, which programmes/policies/performance parameters/quality measures are in place? (please elaborate below): homecare or hospital targeted? ___

9. Does national targets/procedures/regulation exist for patient rights to choose between treatment regimes, hereunder reimbursement of services (e.g. prevention tools)?
   Yes/no: ___ • Pressure ulcers (tic x): ___
   • Leg ulcers: ___ • Diabetic foot ulcers: ___
   • Healthcare associated infections in wounds: ___
   If yes, which programmes/policies/performance parameters/quality measures are in place? (please elaborate below): homecare or hospital targeted? ___

Management of the Diabetic Foot

This 4 day theoretical course & practical training gives participants a thorough introduction to all aspects of diagnosis, management and treatment of the diabetic foot.

Lectures will be combined with practical sessions held in the afternoon at the diabetic foot clinic at the Pisa University Hospital.

Lectures will be in agreement with the International Consensus on the Diabetic Foot & Practical Guideline on the Management and Prevention on the Diabetic Foot.

This course is endorsed by EWMA.
Mark Your Calendar

Clinical Symposium on Advances in SKIN & WOUND CARE
The Conference for Prevention and Healing

For more information on topics, speakers, continuing education, submitting a poster presentation, registration fees, and more... Go to SymposiumOnWoundCare.com or Call 1-800-346-7844 x 7750

September 9-12, 2011
Gaylord National Hotel & Convention Center
National Harbor, MD
BACKGROUND
Research within wound care is fragmented and it is difficult to find validated data on the prevalence and costs of wounds. The EWMA Patient Outcome Group has for some time been working for creating better evidence in wound care and spreading the understanding of the complex approach to wound care research.

The purpose of the EWMA Wound Survey is to uncover the true resource costs of wounds to hospital and community care health care providers in different countries in Europe. Uncovering the prevalence of wounds, the hours and time consumption of health care professionals, and the costs of treatment materials and wound-related hospitalisation in specific health care providers’ organisations, serves to raise awareness of the true significance of good wound care.

Specifically the surveys will focus on:
1) The prevalence of all types of wounds, in both hospitals and in municipalities/community service.
2) The costs of wound treatment in hospitals and in municipalities/community care.
3) Convey publications and discussion papers/arguments that can serve as a political tool to increase awareness among politicians of the actual prevalence of wounds and to reveal the actual resources being used to treat the wounds.

METHODS
The studies are part of a EWMA project, which will cover several European countries. The first study using this methodology was done in Hull in the UK, published in the International Wound Journal, 20081 and this methodology has been adapted for the EWMA studies.

The study is intended to be made as a “point prevalence” study. For practical reasons, data will be collected over 2 days in hospitals and over 1 week in communities. Data are collected by going through all patient files in all hospital wards and in all community nursing centres as well as in all nursing homes.

The researchers all take an active role in gathering the data and in obtaining approval for the study with the hospital management and with the community nursing service.

The data are collected for each patient are categorised and represent some of the following:
- Number of wounds
- Condition of the wound
- Type of wound
- Place of origin

The nursing staff collecting the data will access the wounds and record the time consumption for each patient per dressing change, for travelling time and for documentation. Combining the time consumption with the average cost of a nursing hour, and extrapolating the data to the entire country, the total cost for the nursing time consumption for wound treatment can be calculated.

Similarly, the total cost for dressings and wound-related hospitalisation can be calculated, and adding these two costs together a total cost of wound care can be measured.

The data collected in a database from where the statistical analysis is taken from and thus calculated the costs of the wound treatment.

RESULTS
The results of the survey are presented in tables with written analysis and the following is essential to prospects of the idea behind the survey.
The prevalence of the wound collected in both hospital and municipalities/community care is presented, hereunder the following parameters are covered:
- No. of Citizens covered (population)
- Percentage of inhabitants
- No. of Patients with wound(s)
- Prevalence per 1000 population
- Percentage of hospital patients with wounds
- Calculated total no. of patients with wound(s)

The different types of wounds are presented:
- Acute/surgical wound
- Pressure Ulcers
- Leg Ulcers
- Diabetic Foot Ulcers
- Other
- Total no

Furthermore, the types of wounds are correlated with the resource consumption of the treatment of the wound. The results presented are:
- Nursing time (minutes) per dressing change
- Travelling time Documentation time (minutes)
- Total, cost of nursing time
- Total cost of dressings
- Total cost nursing time and dressings
- Total cost of wound-related hospitalisation

**CONCLUSION**

The purpose of the surveys is to present the costs in the individual country of wound care. The results of the survey will convey the ability to hospital and municipalities/community care givers to view their actual cost. This will facilitate a dialogue with policy makers and other administrators and result in saved money and improvement of the quality of life for the patients.

Currently the surveys of this kind have been conducted in England and Denmark and the results are presently being processed in Denmark. Further surveys are planned in Germany, Italy and Portugal and later in France and Spain.

**The Danish Wound Survey**

Nina Bækmark, MSc
Finn Gottrup, Professor, MD, DMSci.
Eskild W. Henneberg, MD
John Posnett, BA (Hons), DPhil (Econ). Heron Health
Jan Sørensen, MD
Rikke Trangbæk, MSc
National collaboration for the Leg Ulcer & Compression Seminars 2011

Together with the wound management associations in the Slovak Republic, Austria and Hungary, the International Compression Club (ICC) and EWMA arrange a sequence of 3 Leg Ulcer & Compression seminars in Bratislava, Vienna and Budapest on the 10th, 11th and 13th of October 2011.

The national wound management associations involved are the Austrian Wound Association (AWA), the Slovak Wound Care Association (SSOOR), the Hungarian Association for the Improvement in Care of Chronic Wounds and Incontinence (SEBINKO) and the Hungarian Wound Care Society (MSKT).

The program draws on the existing ICC consensus documents on compression therapy as well as results and experiences gained through the implementation of the EWMA Central & Eastern European Leg Ulcer Project (LUP) carried out by the wound associations and project teams in Slovenia, Poland and the Czech Republic.

The overall objective of the Leg Ulcer & Compression seminars is to discuss and plan for the establishment of national consensus on prevention and treatment of leg ulceration using compression therapy. In each country the seminar program is based on the current national situation with regards to the treatment of leg ulceration.

Further information and preliminary programme for the Leg Ulcer & Compression seminars is available at www.ewma.org/icc-ewma-seminar/

The role of the national wound associations

In order to achieve the objectives of the Leg Ulcer & Compression seminars a close collaboration between the local wound associations, the ICC and EWMA is essential.

Apart from chairing the Leg Ulcer & Compression seminars together, the national associations play a key role in facilitating the involvement of national stakeholders in the seminars and the follow-up activities which may prove to be the most important result of the seminars.

In Hungary, the annual meetings of MSKT and SEBINKO will take place in connection with the Leg Ulcer & Compression seminars. The two Hungarian associations will hold their meetings with a joint exhibition on 12 October at the same venue where the seminars will take place on 13 October.

For more information about the national wound associations please see below.

AWA
Austrian Wound Association
www.a-w-a.at
No. of members: 240
President: Franz Trautinger
Activities:
– Annual Congress
– Foster education and research in wound care

MSKT
Hungarian Wound Care Society
www.euuzlet.hu/mskt/
President: Dr. Hunyadi János
Activities:
– Annual congress every year in October
– Publishes the journal Sebkezelés Sebgyógyulás
– Aims at spreading of practical and scientific knowledge regarding wound healing between MD’s and health care workers.

SEBINKO
Hungarian Association for the Improvement in Care of Chronic Wounds and Incontinence
www.sebinko.hu
No. of members: 198
President: Fokiné Karap Zsuzsanna
Activities:
– Annual congress every year in October
– Publishes the SEBINKO Journal twice a year

SSOOR
Slovak Wound Care Association
www.ssoor.sk
No. of members: 31
President: Jozefa Košková
Activities:
– Cooperation with teaching institutions and wound care specialists
– Review the wound situation in Slovakia
For information about the programme, registration etc. please visit the website www.ewma.org/icc-ewma-seminar

The seminars will be held in local languages and English with simultaneous translation.
Corporate B

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Fax: +49 40/4909-6666
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www.cutimed.com

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Fax: +49 36071 9009599
www.curea-medical.de

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www.flenpharma.com

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www.life-wave.com

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1118 BG Schiphol Airport
The Netherlands
www.nutricia.com

Organogenesis Switzerland GmbH
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Baarerstrasse 2
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Switzerland
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www.organogenesis.com

Phytoceuticals
Phytoceuticals
Zollikerstrasse 44
8008 Zurich
Switzerland
Tel: +41 58 800 58 58
www.1wound.info

Argentum Medical LLC
Argentum Medical LLC
Silver Antimicrobial Dressings
2571 Kanevile Court
Geneva, Illinois 60134
U.S.A.
Tel: +1 630-232-2507
Fax: +1 630-232-8005
www.silverlon.com

TEVA
TEVA
5 Basel St.
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Tel: +972 8 932 4000
Fax: +972 8 932 4001
www.polyheal.co.il

Laboratoires Urgo
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42 rue de Longvic
B.P. 157
21304 Chenôve
France
Tel: +33 3 80 54 50 00
Fax: +33 3 80 44 74 52
www.urgocom
## Conference Calendar

<table>
<thead>
<tr>
<th>Conferences</th>
<th>Theme</th>
<th>2011</th>
<th>Days</th>
<th>City</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Meeting of the Chronic Wounds Initiative (ICW)</td>
<td></td>
<td>May</td>
<td>11-12</td>
<td>Bremen</td>
<td>Germany</td>
</tr>
<tr>
<td>Annual Meeting of the Italian Nurses’ Cutaneous Wounds Association (AISLeC)</td>
<td></td>
<td>May</td>
<td>12-14</td>
<td>Bologna</td>
<td>Italy</td>
</tr>
<tr>
<td>21st Conference of the European Wound Management Association</td>
<td>Common Voice – Common Rights</td>
<td>May</td>
<td>25-27</td>
<td>Brussels</td>
<td>Belgium</td>
</tr>
<tr>
<td>12th EFORT Congress</td>
<td></td>
<td>Jun</td>
<td>1-4</td>
<td>Copenhagen</td>
<td>Denmark</td>
</tr>
<tr>
<td>International Lymphoedema Framework Conference</td>
<td>Towards Global implementation of Best Practice – Opportunities and Challenges</td>
<td>Jun</td>
<td>16-18</td>
<td>Toronto</td>
<td>Canada</td>
</tr>
<tr>
<td>Annual Meeting of German Society of Wound Healing and Wound Treatment (DGFW)</td>
<td>Guidelines and quality standards of Fascinating Biotechnology</td>
<td>Jun</td>
<td>23-25</td>
<td>Hannover</td>
<td>Germany</td>
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<tr>
<td>14th Annual European Pressure Ulcer Meeting (EPUAP)</td>
<td>Pressure Ulcer Research Achievements Translated to Clinical Guidelines</td>
<td>Aug</td>
<td>31-2</td>
<td>Oporto</td>
<td>Portugal</td>
</tr>
<tr>
<td>30th Annual meeting of the European Bone and Joint Infection Society</td>
<td>Biofilm and Health Economics in Bone and Joint Infections</td>
<td>Sep</td>
<td>15-17</td>
<td>Copenhagen</td>
<td>Denmark</td>
</tr>
<tr>
<td>Annual meeting of Italian Association for the Study of Cutaneous Ulcers (AIUC)</td>
<td></td>
<td>Sep</td>
<td>21-24</td>
<td>Ancona</td>
<td>Italy</td>
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<tr>
<td>Pisa International Diabetic Foot Courses</td>
<td></td>
<td>Oct</td>
<td>3-6</td>
<td>Pisa</td>
<td>Italy</td>
</tr>
<tr>
<td>Bi-Annual Conference of the Wound Management Association of Ireland</td>
<td></td>
<td>Oct</td>
<td>4-5</td>
<td>Galway</td>
<td>Ireland</td>
</tr>
<tr>
<td>21st Annual European Tissue Repair Society</td>
<td></td>
<td>Oct</td>
<td>5-7</td>
<td>Amsterdam</td>
<td>Netherlands</td>
</tr>
<tr>
<td>EWMA Leg Ulcer and Compression Seminars</td>
<td></td>
<td>Oct</td>
<td>10</td>
<td>Bratislava</td>
<td>Slovakia</td>
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<tr>
<td>EWMA Leg Ulcer and Compression Seminars</td>
<td></td>
<td>Oct</td>
<td>11</td>
<td>Vienna</td>
<td>Austria</td>
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<tr>
<td>EWMA Leg Ulcer and Compression Seminars</td>
<td></td>
<td>Oct</td>
<td>13</td>
<td>Budapest</td>
<td>Hungary</td>
</tr>
<tr>
<td>4th Latin American Conference on Ulcers</td>
<td></td>
<td>Oct</td>
<td>11-14</td>
<td>Rio de Janeiro</td>
<td>Brazil</td>
</tr>
<tr>
<td>EWMA Industry Course 2011</td>
<td>Health Economics and Generating Evidence in wound healing – clinical trials, alternative end points and outcome</td>
<td>Oct</td>
<td>13-14</td>
<td>Budapest</td>
<td>Hungary</td>
</tr>
<tr>
<td>The Annual Fall Symposium on Advanced Wound care (SAWC/WHS)</td>
<td></td>
<td>Oct</td>
<td>13-15</td>
<td>Las Vegas</td>
<td>USA</td>
</tr>
<tr>
<td>First International Pediatric Wound Care Symposium</td>
<td></td>
<td>Oct</td>
<td>27-29</td>
<td>Rome</td>
<td>Italy</td>
</tr>
<tr>
<td>Biannual meeting of the Woundcare Consultant Society</td>
<td></td>
<td>Nov</td>
<td>22-23</td>
<td>Utrecht</td>
<td>Netherlands</td>
</tr>
<tr>
<td>Annual Meeting of the Danish Wound Healing Society</td>
<td></td>
<td>Nov</td>
<td>24-25</td>
<td>Kolding</td>
<td>Denmark</td>
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<tr>
<td>2012</td>
<td></td>
<td></td>
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<tr>
<td>16th National Conference of wound healing of CPC</td>
<td></td>
<td>Jan</td>
<td>15-17</td>
<td>Paris</td>
<td>France</td>
</tr>
<tr>
<td>10th National Australian Wound Management Association Conference</td>
<td></td>
<td>Mar</td>
<td>18-22</td>
<td>Sydney</td>
<td>Australia</td>
</tr>
<tr>
<td>World Council of Enterostomal Therapists Conference</td>
<td></td>
<td>Apr</td>
<td>19-23</td>
<td>Adelaide</td>
<td>Australia</td>
</tr>
<tr>
<td>22nd Conference of the European Wound Management Association</td>
<td></td>
<td>May</td>
<td>23-25</td>
<td>Vienna</td>
<td>Austria</td>
</tr>
<tr>
<td>4th Congress of the World Union of Wound Healing Societies</td>
<td>Better care – Better Life</td>
<td>Sep</td>
<td>7-12</td>
<td>Yokohama</td>
<td>Japan</td>
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<tr>
<td>10th Scientific Meeting of Diabetic Foot Study Group (DFSG)</td>
<td></td>
<td>Sep</td>
<td>28-30</td>
<td>Potsdam</td>
<td>Germany</td>
</tr>
</tbody>
</table>

For web addresses please visit [www.ewma.org](http://www.ewma.org)
FUNDRAISING CAMPAIGN DURING THE EWMA BRUSSELS CONFERENCE

Support the WAWLC Podoconiosis Eradication Project in Ethiopia

AIMS OF THE WAWLC INITIATIVE:

- Training for 200 health care providers from 50 different hospitals, clinics and organisations
- Training to Health Extension Workers and local non-medical community agents, especially women
- Provision of kit (education material and supplies) for each participant to teach & treat patients
- Meeting with Ethiopian Ministry of Health in August 2011

Donations are welcomed at the EWMA Conference or at http://wawlc.org/donation.html

About Podoconiosis:

- An endemic non-filarial elephantiasis, commonly known as “Mossy Foot”.
- Affects > 1 million people in rural villages of Ethiopia.
- Listed by WHO as neglected tropical disease in 2010.

EWMA has since 2009 been part of the WAWLC initiative.
Building on the long standing tradition and the relationship between EWMA and the European Tissue Repair Society, the interaction between both societies has become even more intense during the last two years. To continue their established relationship and develop an even closer collaboration, a combined session was scheduled during the 20th European Tissue Repair Society Congress in Gent Belgium, 15-17 September 2010.

The local host of the meeting was the University of Gent. The congress venue was an historical building of the University (‘het Pand’) in the historical part of the old city. The congress was attended by numerous delegates from all over Europe and the United States of America.

The topic of the combined EWMA/ETRS session was ‘Management of Acute Wounds.’ This session was chaired by Finn Gottrup and Gerrolt Jukema (a member of the EWMA council and a board member of the ETRS).

Martin Koschnik highlighted in his presentation the clinical relevance of antiseptic treatment of contaminated and infected wounds with polyhexanid (PHMB) solution.

Gerrolt Jukema presented experimental clinical data on infected trauma and orthopedic wounds. In addition, new modalities for treatment of acute and infected wounds were presented, including topical negative wound therapy and the installation technique with polyhexanid solution. Maggot therapy for treatment of infected wounds, including data from his experimental research, was also presented.

Finn Gottrup, as the current chair of the EWMA Patient Outcome Group, shared his thoughts with the audience about problems with evidence and outcomes in wound healing studies. This session was very well attended by congress participants and featured an interactive discussion with the presenters, reflecting the close relationship between the lab and the clinician. Experimental research, based on clinical problems studied in relation with patients’ care-related infections, can be a map guiding us to improved and quality-related patient care.

A new combined, clinical-orientated session of both societies is scheduled at the 21st Annual European Tissue Repair Society Congress in Amsterdam, The Netherlands, on October 5th-7th 2011. It is sure to be both interesting and informative, and further develop the close relations between these two wound societies.
The 14th national wound healing congress in Helsinki, Finland

In February this year, The Finnish Wound Care Society organized its fourteenth, national, two day congress on wound healing. The theme was: Challenging and uncommon wounds.

The theme was selected according to suggestions from the field. Although these wounds are rare and more seldom diagnosed than wounds such as venous leg ulcers, they pose real challenges both for the patient and for the health care system. The theme was split into four main sessions.

The first session focused on malignant fungating wounds. We had a leading Finnish dermatopathologist to give an introductory lecture on the different manifestations of skin cancers and cancer metastasis to the skin. This was followed by the different treatments and finally there was a nurse-led lecture on the special wound care of these extremely hard-to-heal or non-healing wounds. Caring for a patient with a malignant fungating wound is a challenge for any nurse or doctor regardless of their years of experience in wound care. The wounds cause huge distress for the patient including pain, malodour, haemorrhage, excessive exudate and infection, altered body image and social isolation. Neglect may also play its role with patients with advanced malignant wounds. The patient and his family may fail to seek medical help even if the wound is clearly visible. The stories about the patients with malignant fungating wounds were listened to attentively by our audience. The informative lecture improved both their knowledge and clinical understanding of patients with malignant fungating wounds.

The second session focused on acute traumatic wounds, especially on wounds in fragile elderly skin or traumatic amputations. This lecture was very appropriate as, at the same time as our conference, the Fair Centre was also hosting a big motorcycle event and many of those traumatic amputations discussed seemed to have happened to motorcyclists!

The third session about pressure ulcers (PU) was held the next morning. This theme was chosen to cover the new EPUAP and NPUAP Guidelines. The session included the presentation of the new Guidelines which the Finnish Wound Care Society has had translated into Finnish to enable healthcare professionals in Finland to fully understand them; no more excuses for not preventing PUs! Our fourth session concentrated on various types of skin vasculitis, from the diagnosis to the treatment and to local wound care.

Along with the main sessions, we had organised practical workshops. The workshops focussed on five common wound care themes:
- debridement,
- ABI- measuring,
- compression therapy,
- how to choose a right wound care product and
- how to dress a difficult wound.

There were 96 participants at these workshops (fully booked). And the participants had a chance to learn “hands on” about the themes. Each workshop included about 20 minutes introduction and 20 minutes of practical experience. Organizing workshops requires strenuous efforts from our organizing committee and is not financially profitable, but we included them as they offer a very beneficial way of learning.

The venue was in the Helsinki Fair Centre, in the congress area. We have chosen this same venue for four years now, because it is very easy to get there from all over Finland. Also the personnel of the Fair Centre are very professional and have become almost “friends” to us which made the hard work of organizing such an event easier for us all.

On the first night of the congress we always have a ‘get together’ evening party which also takes place in the Fair Centre. The event is free of charge and has a free buffet for participants. This year’s theme was “TexMex” and featured not only a buffet of food chosen to go with the theme, but also some Tequila girls who danced and served tequila for those who wanted to enjoy tequila slammers; some participants had quite a headache the next morning!
The objective of the evening party is to make social contacts with other delegates and to meet friends. The company members can also attend, so it is also a good marketing possibility for them. The party has always been very successful and popular with the participants; this year we had there almost 300 partygoers.

Over all we had around 650 participants at this year’s congress. This was only about 100 fewer than the year before, so our fears about the theme were unnecessary. We had a marketing area of 280m² for wound care companies and 37 companies attended. We are very strict about what kinds of companies are allowed to participate; only those companies that are genuinely involved in wound care are welcomed. This is because we want to preserve our status as professionals. We also reward our lecturers well for presenting the lectures; that way we can ensure very high standard specialist lectures and we can be sure the knowledge is always up to date and evidence based.

In all, our congress was, once again, a very successful event: the lectures were brilliant and kept to schedule, the food was good, the exhibition looked very impressive and the feedback that we had was mainly positive. Next year is our 15th national congress. The planning and organizing has already started, the theme has been chosen and marketing has begun.

The congress will be built around the theme of acute wounds, so that it can serve as many healthcare professionals as possible. This theme was last presented six years ago and the event was the biggest success we’ve ever had. That time there were over 1100 participants and we are hoping to have the same amount of participants next year or even more; that will be a really huge challenge for us! However, with a good program, top lecturers and the good reputation that we have gained over the years, the challenge will not be an impossible one!

Since 2007, EWMA has successfully offered students of wound management from institutes of higher education across Europe the opportunity to take part of academic studies whilst participating in the EWMA Conference. In 2011 it is expected that students from the institutes listed below will participate in the EWMA UCM in Brussels.

The opportunity of participating in the EWMA UCM is available to all teaching institutions with wound management courses for health professionals.

EWMA strongly encourages teaching institutions and students from all countries to benefit from the possibilities of international networking and access to lectures by many of the most experienced wound management experts in the world.

Yours sincerely

Zena Moore,
Chair of the EWMA Education Committee, EWMA President

Participating institutions:

Haute École de Santé Geneva, Switzerland
Escola Superior de Enfermagem de Lisboa Portugal

University of Hertfordshire United Kingdom

Universidade Católica Portuguesa Porto, Portugal

For further information about the EWMA UCM, please visit the Education section of the EWMA website www.ewma.org or contact the EWMA Secretariat at ewma@ewma.org
Wound Treatment Organisation established in Ukraine

On November 25-26th, 2010, in Kiev, the capital of Ukraine, the conference “Wounds, Wound Infections and Wound Closure” was organised by the newly established Ukrainian Wound Treatment Organization (UWTO).

This association is the first in the Ukraine that focuses on wound treatment. The instigators of UWTO have worked tremendously hard establishing local sections in 15 regions of the Ukraine. In the beginning the Ukrainian association was mainly based on the initiative of doctors from various specialties but there is a clear determination for the association to become open to healthcare professionals from multiple disciplines.

UWTO has a very strong council of well-known Ukrainian physicians who have been elected to the main positions. The council is represented by Professor B. M. Datsenko as President, and Professors E.J. Fistal, G. P. Kozynets and T. Tamm as vice presidents.

During the process of establishment, several consultations took place with EWMA Council and EWMA Secretariat. The close co-operation with EWMA is due to the fact that EWMA supports local initiatives of establishment of national wound management societies in countries across Eastern Europe.

To date Ukrainian delegates have visited the annual EWMA conference in Geneva and have also participated in national meetings in Lithuania and Belarus. The exchange of experiences with neighbouring countries regarding the establishment of their own associations greatly helped the Ukrainian founders during the organising process for UWTO. More information about UWTO can be found on their web-site www.uwto.org.ua.

The conference “Wounds, Wound Infections and Wound Closure” was organised in the Academy for Postgraduate Studies of Ukraine. The procedure of registration was finalised in the late autumn after a long arrangement process.

The conference program included three thematic sessions: Wound Care and Debridement, Surgical Wound Reconstruction, and Modern Trends in Management of Wound and Wound Infections. EWMA was represented by the Council Member Rytis Rimdeika, who had the privilege of opening the conference with an introductory presentation on EWMA.

The conference attracted more than 200 participants from various regions of the Ukraine, and neighbouring Belarus and Russia. Participants from numerous regions of the Ukraine presented papers and case reports from their clinical practices. In addition, round table discussions on diabetic foot issues were held by prominent lecturers from the Ukraine. The conference also featured separate poster sessions which were held in the exhibition area.

During the conference there were exhibitions of wound dressings, wound care equipment, medical devices and pharmaceutical products. Representatives of well-known international medical companies as well as local manufacturers participated actively in the exhibition and also organised concurrent sessions and workshops. The conference was followed by a welcome party for all participants.
IS OEDEMA A CHALLENGE IN WOUND HEALING?

Through a mixture of lectures, workshops and interactive sessions the course will bridge theory and practice, addressing a broad range of topics including:

- Oedema as a problem in different types of wounds and what impact it has
- The pathophysiology of oedema
- Psycho-social impact of oedema
- Methods for diagnosing different types of oedema
- Prevention and management
- Development of evidence based outcome measurement of oedema in wound healing
- Infection
- Associated skin complications

Credits for Continuing Medical Education (CME) will be awarded by the European Union of Medical Specialists.

For more information about the programme, registration etc. please visit

www.ewma.org/woundcourse
Cooperating Organisations

AFIScep.be
Francophone Nurses’ Association in Stoma Therapy, Wound Healing and Wounds
www.afiscep.be

AISLeC
Italian Nurses’ Association for the Study of Cutaneous Wounds
www.aislec.it

AIUC
Italian Association for the study of Cutaneous Ulcers
www.aiuc.it

APTFeridas
Portuguese Association for the Treatment of Wounds
www.aptferidas.com

AWA
Austrian Wound Association
www.a-w-a.at

BEFEWO
Belgian Federation of Woundcare
www.befewo.org

BWA
Bulgarian Wound Association
www.woundbulgaria.org

CNC
Clinical Nursing Consulting – Wondzorg
www.wondzorg.be

CSLR
Czech Wound Management Society
www.cslr.cz

CWA
Croatian Wound Association
www.huzr.hr

DGfW
German Wound Healing Society
www.dgfw.de

DSFS
Danish Wound Healing Society
www.saar.dk

FWCS
Finnish Wound Care Society
www.suomenhaavanhoitoyhdistys.fi

GAIF
Associated Group of Research in Wounds
www.gaif.net

GNEAUPP
National Advisory Group for the Study of Pressure Ulcers and Chronic Wounds
www.gneaupp.org

ICW
Chronic Wounds Initiative
www.ic-wunden.de

LBAA
Latvian Wound Treating Organisation

LUF
The Leg Ulcer Forum
www.legulcerforum.org

LWMA
Lithuanian Wound Management Association
www.liza.lt

MASC
Maltese Association of Skin and Wound Care
www.mwcf.madv.org.mt/

MSKT
Hungarian Wound Care Society
www.euudet.hu/mskt/

MWMA
Macedonian Wound Management Association

NATVNS
National Association of Tissue Viability Nurses, Scotland

NIFS
Norwegian Wound Healing Association
www.nifs-saar.no

NOVW
Dutch Organisation of Wound Care Nurses
www.novw.org

ROWMA
Romanian Wound Management Association
www.artmp.ro
SAfW
Swiss Association for Wound Care
(German section)
www.safw.ch

SAfW
Swiss Association for Wound Care
(French section)
www.safw-romande.ch

SAWMA
Serbian Advanced Wound Management
Association
www.serbiawound.org

SEBINKO
Hungarian Association for the
Improvement in Care of Chronic Wounds and
Incontinencia
www.sebinko.hu

SFFPC
The French and Francophone
Society of Wounds and Wound Healing
www.sffpc.org

SSiS
Swedish Wound Care Nurses Association
www.sarsjukskoterskor.se

SSOOR
Slovak Wound Care Association
www.ssoor.sk

SUMS
Icelandic Wound Healing Society
www.sums-is.org

SWHS
Serbian Wound Healing Society
www.lecenjerana.com

SWHS
Swedish Wound Healing Society
www.sarlakning.se

TVS
Tissue Viability Society
www.tvs.org.uk

URuBiH
Association for Wound Management of
Bosnia and Herzegovina
www.urubih.ba

V&VN
Decubitus and Wound Consultants,
Netherlands
www.venvn.nl

WMAK
Wound Management Association of Kosova

WMAOI
Wound Management Association of Ireland
www.wmaoi.ie

WMAS
Wound Management Association Slovenia
www.dors.si

WMAT
Wound Management Association Turkey
www.yaradernegi.net

WMS (Belarus)
Wound Management Society

International Partner Organisations

AWMA
Australian Wound Management Association
www.awma.com.au

Debra International
www.debra-international.org

NZWCS
New Zealand Wound Care Society
www.nzwcs.org.nz

AAWC
Association for the Advancement of Wound Care
www.aawconline.org

ILF
International Lymphoedema Framework
www.lympho.org

SOBENFeE
Brazilian Wound Management Association
www.sobenfee.org.br

Associated Organisations

Leg Club
Lindsay Leg Club Foundation
www.legclub.org

LSN
The Lymphoedema Support Network
www.lymphoedema.org/lsn

For more information about
EWMA’s Cooperating Organisations
please visit www.ewma.org
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