



EWMA Educational Development Programme

Curriculum Development Project

**Education Module:**

**Physiology of wound healing & tissue repair**

Latest revision: January 2018



## **ABOUT THE EWMA EDUCATIONAL DEVELOPMENT PROGRAMME**

The Programme is designed to assist students and healthcare professionals who work with patients with wounds and related skin conditions and wish to develop and/or increase their knowledge and skills in order to meet patient needs.

Overall, the Programme aims to:

- Provide students and healthcare professionals with the knowledge and skills to equip them to perform their role in the delivery of optimal wound care.
- Provide contemporary, interdisciplinary, product/brand neutral wound management education that is endorsed by EWMA.
- Provide quality standards against which other organisations can evaluate existing wound management programmes.
- Achieve European acceptance by developing an educational framework that is in line with European Commission educational initiatives in order to disseminate best practice in wound care.

## **ABOUT THE CURRICULUM DEVELOPMENT PROJECT**

The Curriculum Development Project is at the heart of the Educational Development Programme. The aim of the Project is to develop a flexible curriculum, consisting of a number of modules.

All modules are based on a standard template but individually focused on a specific aspect of wound management. Each module is developed by a small group consisting of members of the EWMA Education Committee and/or affiliated wound care key specialists. For an updated list of the currently available modules please visit the education sub page at [www.ewma.org](http://www.ewma.org).

## **ABOUT THIS MODULE**

The Physiology of wound healing / tissue repair module aims to:

- Provide students up to date knowledge of skin and tissue anatomy, biology and biochemistry.
- Provide students up to date knowledge of skin and tissue physiology and healing processes.



## **MODULE CONTENT**

### **1. Elaborating Body**

European Wound Management Association (EWMA)

### **2. Date of production of module**

January 2003

### **3. Latest review date**

January 2018

### **4. Module intended learning outcomes**

This module provides opportunities for health professionals to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas:

#### **A. Intellectual Skills – Knowledge and Understanding**

Participants will have knowledge of:

1. Healthy skin and tissue anatomy and physiology.
2. Skin and tissue reactions in relation to acute and chronic wounds.
3. Cellular and biochemical activity in wounds.
4. Wound physiology in relation with age, type and aetiology of wounds.

#### **B. Practical Skills – Skills and Attributes:**

Participants will be able to:

1. Make valid prognoses of wound healing evolution identifying the specific factors that increase risk status (could be potential or actual).
2. Recognize different stages of wound healing.
3. Undertake actions of prevention to diminish bad wound healing and wound stagnation.
5. Demonstrate appropriate documentation skills detailing latest scientific information on wound healing and wound physiology.
6. Communicate with and educate patients and carers about wound healing and wound physiology.



## 5. Teaching/learning methods & strategies

Acquisition of 4.A & 4.B (see above) is through a combination of lectures, small group workshops and learning in practice throughout the module. There is also the possibility of using e-learning in combination with traditional learning methods. Throughout, the learner is encouraged to undertake independent study to both supplement and consolidate what is being taught/ learnt and to broaden individual knowledge and understanding of the subject.

## 6. Assessment methods

Assessment methods will need to vary for each professional group. Understanding will be assessed in a variety of ways e.g. open discussion, formal written exercises, case studies, practice work-books. Throughout, the learner is expected to consolidate the development of practical skills / management skills in the clinical setting.

## 7. Unit content

### INTELLECTUAL SKILLS

#### A. Overview

- Skin: interface between individual and environment
- Prevalence and incidence of acute and chronic wounds and associated skin damage.
- Classification of wound causes and types (i.e. aetiology, time to heal, mechanism of trauma).
- Wound characteristics (size, depth, drainage, degree of contamination, odour, amount of exudation, etc.)
- Wound healing physiology
- Impaired wound healing, role of cellular elements, extracellular matrix and mediators
- Principles of clinical assessment and further investigations (laboratory findings, biopsy, infectiology, etc.) to clarify wound healing disturbances

#### B. Anatomy and physiology of skin and associated tissue

The skin is a complex organ consisting of the epidermis, dermis, and skin appendages, including the hair follicle and sebaceous gland. Therefore, knowledge of the anatomy of skin and related structures in different age groups is of most importance.

Functional properties of the skin as the biggest organ in human with its relation to the environment (interface between individual and surrounding), for example:

- sensitivity
- thermal regulation
- mechanical protection



### **C. Principles of wound healing**

- Repair versus Regeneration
- Phases of wound healing in relation to acute wounds
- Primary / delayed primary / secondary wound healing –
- Importance of immune cell migration. Secretion and balance of cytokines and growth factors leading to proliferation
- Regulation of proliferation and collagen synthesis
- Function of extracellular matrix
- Maturation, remodelling and scarring?

### **D. impaired wound healing**

Knowledge of reasons for delayed wound healing and definition of chronic wounds based on their characteristics and aetiology.

Local and systemic influences leading to impaired wound healing, for example:

- Comorbidities, intrinsic and extrinsic factors affecting wound healing
- Blood supply (perfusion / venous drainage)
- Bacterial load and bioburden, necessity of wound cleansing and debridement
- Exudate management and infection control
- Pain management

## **PRACTICAL SKILLS**

### **A. Assessment**

Including physical, psychological, and social assessment.

- Identification of risk factors for inappropriate wound healing
- Categorisation of the wound based on standardised criteria (For example aetiology, degree of contamination, wound bed properties, amount of exsudate)
- Identification of patient centred management objectives
- Care planning based on clinical, laboratory, histological and pathophysiological findings
- Use of evidence based practice/clinical guidelines
- Referral criteria
- Interdisciplinary team working

### **B. Management of bioburden and infection**

- Assessment /presentation of clinical signs/symptoms, silent infection.
- Local infection (superficial, deep, cellulitis)



- Surgical drainage of deep infections
- Methods of identify infecting agents: Culture and swab techniques, biopsy
- Radiological and other investigations – Isotope scans, Magnetic Resonance Scans.
- Use of topical antiseptics - indications, type and duration of treatment.
- Adjunct therapies and their relevance and practical application.

### **C. Systemic and local pharmacological management**

- Analgesia: Local/systemic
- Nutritional supplements e.g. mineral and vitamin supplementation
- Antibiotic therapy for infection: Indications, type and duration of treatment
- Antibiotic resistance and the importance of following best practice guidelines for use of antibiotics and antimicrobials in wound management<sup>1</sup>

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<sup>1</sup> See EWMA Antimicrobial Stewardship programme and publications at [www.ewma.org](http://www.ewma.org)



## 8. Unit specific learning resources

### Web links

[www.ewma.org](http://www.ewma.org) (Position Documents available at: <http://ewma.org/it/resources/for-professionals/ewma-documents-and-joint-publications/> )

[www.etr.org](http://www.etr.org)

[www.nchta.org](http://www.nchta.org) (Ten systematic reviews relating to chronic wounds)

[Cochrane Library](http://www.cochrane.org)

### Journals

Advances in Skin and Wound Care

Journal of Tissue Viability

Journal of Wound Care

### Books/papers

- Holloway, Samantha, Harding, Keith Gordon, Stechmiller, J. K. and Schultz, G. 2015. *Acute and chronic wound healing*. In: Baranoski, S. and Ayello, E. A. eds. *Wound Care Essentials - Practice Principles 4th Edition*, Lippincott Williams and Wilkins, pp. 82-98.  
<https://www.amazon.co.uk/Acute-Chronic-Wounds-Management-Concepts/dp/0323316212>
- Singh, Shailendra et al: The physiology of wound healing, Surgery - Oxford International Edition , Volume 35 , Issue 9 , 473 – 477, [http://www.surgeryjournal.co.uk/article/S0263-9319\(17\)30136-9/pdf](http://www.surgeryjournal.co.uk/article/S0263-9319(17)30136-9/pdf)
- Orsted H L, Keast D H, Forest-Lalande L, Kuhnke J L, O’Sullivan-Drombolis D, Jin S, Haley J, Evans R. Skin: Anatomy, Physiology, and Wound Healing. 2018, Canadian Association of Wound Care. <https://www.woundscanada.ca/docman/public/health-care-professional/bpr-workshop/166-wc-bpr-skin-physiology/file>

### EWMA Documents

- Franks, P., Barker, J., Collier, M. et al. Management of patients with venous leg ulcer: Challenges and current best practice, J Wound Care, 25; 6, Suppl, 1–67
- Gottrup, F., Apelqvist, J., Bjansholt, T. et al. EWMA Document: Antimicrobials and Non-healing Wounds—Evidence, Controversies and Suggestions. J Wound Care. 2013; 22 (5 Suppl.): S1–S92
- Moore, Z., Butcher, G., Corbett, L. Q., et al. AAWC, AWMA, EWMA Position Paper: Managing Wounds as a Team. J Wound Care 2014; 23 (5 Suppl.): S1–S38