Debridement: treatment, options and selection.

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Introduction

Wound debridement, the removal of devitalised tissue, continues to be a cornerstone of wound management. There are many different methods of wound debridement, these are grouped into autolytic, surgical/sharp, mechanical and biological categories, each of which have specific advantages and disadvantages. The decision as to whether to debride a wound and which method(s) to choose is very individualised, therefore all practitioners involved in wound care must be competent at wound bed assessment and have an awareness of all debridement options available. This article will provide a brief overview of wound bed assessment, provide information about the decision process of whether to debride and describe different methods of wound debridement.

Debridement

The word debridement originated from France and means to remove constraints. Within wound care debridement refers to the removal of adherent, dead or contaminated tissue from the wound and is clearly separated from the act of wound cleansing which is defined as the removal of dirt, foreign material or metabolic waste, (Strohal, Apelqvist, & Dissemond, 2014). The presence of dead/devitalised tissue hinders wound healing, debridement provides the foundation for subsequent tissue growth, (O'Brien, 2003). Appropriate and early debridement accelerates wound healing, this in turn delivers additional benefits of improved quality of care, enhanced patient health and wellbeing and a reduction in treatment costs, (Wounds UK, 2013). The body's natural method of wound debridement is called autolysis, in acute wounds autolytic debridement occurs automatically. During the acute inflammatory state of wound healing neutrophils and macrophages clear devitalised tissue, cell debris or containments preparing the wound bed to allow healing to occur. However, in chronic wounds this autolytic process can be delayed due to increase levels of endotoxins released from damaged cells, (Broadus, 2013). Consequently debridement is often a common goal in the management of chronic wounds and has been included in many clinical guidelines from professional wound organisations such as European Wound Healing Society (Strohal et al., 2014) and Wounds UK (Wounds UK, 2013).

Wounds Assessment

Generalist nurses remain the primary point of care for most patients with a wound, subsequently they play an important role in the clinical decision making regarding whether debridement is necessary, which method to use and whether a patient needs to be referred on to specialist services such as tissue viability, (Wounds UK, 2013). Therefore it is vital that all practitioners involved in wound care are able to confidently perform holistic wound assessment. Holistic assessment of the patient and the wound is needed to ensure accurate diagnosis of the underlying factors that could be the cause of the wound and to identity elements that could delay wound healing, (Cook, 2012). To ensure effective treatment of patients with wounds the diagnostic process should:

- Determine the cause of the wound
- Identify any co-morbidities/complications that may contribute to the wound or delay healing
- Assess the status of the wound including location and size, condition of wound bed, signs of increased bacterial load, level of exudate, and condition of peri wound skin
- Established appropriate aims of wound care

  (World Union of Wound Healing Societies, 2008; Wounds UK, 2013).

Debridement is common practice in many wounds and it can be applied to any wound type, irrespective of origin and diagnosis. However, practitioners need to have a clear understanding of the underlying cause of the wound and whether healing is the realistic/appropriate goal, as in certain circumstances debridement may not be beneficial for the patient and in some instances could be detrimental. For example patients with peripheral arterial disease who develop distal gangrene (Figure 1), with dry gangrene it is more appropriate to leave these wounds without any dressings rather than promoting debridement. This is because in the debridement process levels of moisture at the wound bed will increase leading to increased risk of infection and due to the arterial disease this would expose the patient to an increased risk of amputation. In patients with peripheral arterial disease debridement should only be initiated by the specialist vascular team, ideally after adequate revascularisation has been established.

Figure 1

When to debride?

The type of tissue found in the wound bed often provides a clear indication as to whether debridement is required but other factors such as bio-burden, wound edges and condition of peri wound skin can also influence the decision of whether debridement is required. There are relatively few wounds where it is not safe to debride so long as the correct method of debridement is chosen, (Wounds UK, 2013). Where there is any evidence of slough (Figure 2), necrotic tissue or eschar (Figures 3 & 4) debridement of this non-viable tissue will aid to progress the wound towards healing. The presence of non-viable tissue will delaying wound healing as it hinders the formation of granulation tissue but it can also be a cause of bacterial growth increasing the risk of infection, (Broadus, 2013). Debridement may also assist in wound assessment or pressure ulcer categorisation as removing non-viable tissue, slough and excess exudate this will help to visualise the wound bed depth and condition more accurately, (Ousey & Cook, 2011).

Figure 2

Figure 3

Figure 4

Debridement options

Various factors influence the choice of method of debridement such as wound type, anatomical location, extent of devitalised tissue, pain, patient environment, resources and patient choice. Debridement may only need to be performed once but more commonly episodic or continual debridement may be required over a number of weeks, (Ousey & Cook, 2012). Therefore there needs to be consideration of the risk that the devitalised tissue presents to the patient to help determine the speed of debridement required. Wound debridement remains a generalist nursing skill and all practitioners involved in wound care need to be aware of the wide range of debridement options. However, certain methods of debridement, such as sharp debridement, can only be performed by clinicians with appropriate knowledge and clinical skills. Nevertheless, it is important that the most appropriate debridement method selected is based on it providing best outcomes for the patient and not merely limited to the skills of the practitioner. If the practitioner feels they do not have the knowledge/skills to perform the certain methods of debridement they should seek support from others or refer the patient on to someone with the requisite skills, such as specialist wound nurses. For many wounds more than one method of debridement may be required and currently there is no robust evidence favouring one method of debridement over another.

Methods of debridement commonly used in the United Kingdom (UK) include:

- Autolytic
- Larval
- Mechanical
- Sharp
- Surgical

Autolytic

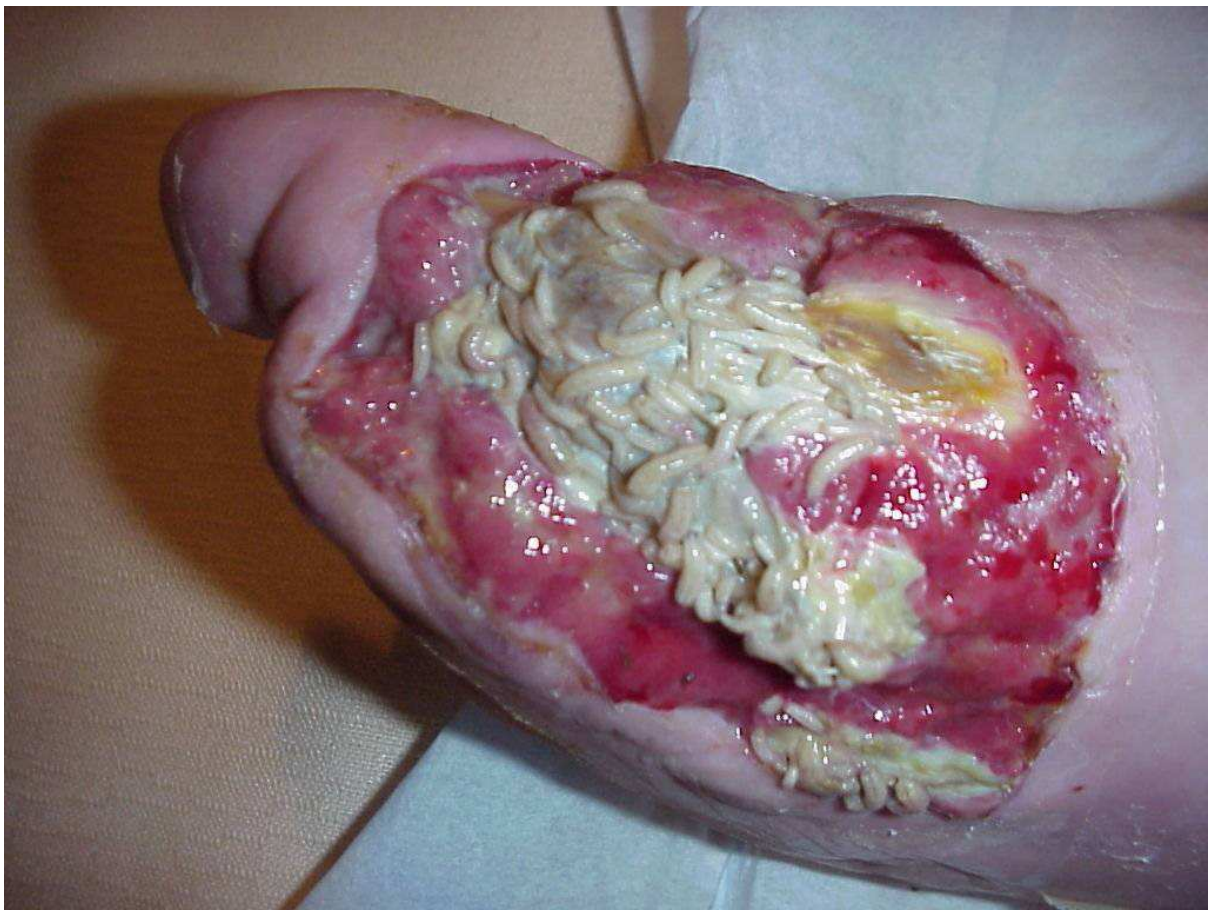
Autolytic debridement is the most commonly used method of debridement, it refers to the use of the body's own enzymes and moisture to rehydrate, soften and liquefy devitalised tissue, (Gray et al., 2010). The majority of wound dressings, such as hydrogels, hydrocolloids, and hydrofibres, debride by the process of autolysis. Wound dressings facilitate debridement by either donating moisture or maintaining a moist wound environment which provides the optimal environment for the body's enzymes to break down the non-viable tissue. The advantages of autolytic debridement is that there is relatively little pain associate with this form of treatment, it is versatile, selective and requires minimal skill/training. Autolytic debridement is useful where there are small volumes or superficial slough, however it can be a slow process often taking weeks to achieve a clean wound bed, this slow rate of debridement may raise the potential for infection and maceration of the peri-wound skin, (Gray et al., 2010).

Larval

Larval therapy (maggots) is a form of biological debridement (Figure 5), the larvae of the greenbottle fly has been bred in sterile conditions for medical use for a number of years. The maggots debride by secreting a proteolytic enzyme which liquefies the dead tissue, once this tissue is dissolved the maggots then ingest the fluid neutralising any bacteria in their gut. They don't, as commonly believed, bite or chew the dead tissue. Other benefits of larvae therapy have been published including increased irrigation of the wound bed by the movement of the larvae stimulating exudate production (Sherman, 2002) and increased granulation growth rates through the changes in PH level on the wound bed increasing oxygenation and number of growth factors, (Wollina, Liebold, & Schmidt, 2002). Larval therapy offers a fast selective method of debridement but is not suitable for all wounds. The effectiveness solely relies on the survival of the larvae, so there needs to be consideration of whether they may be squashed, for instance if used on a heel of an active patient or if exudate levels are very high that they may drown. The application of loose maggots can be tricky and does require previous training, however, the marketing of 'bagged' maggots has reduced the specialist skill level previously required. Not all patients accept the idea of maggots on their wound and detailed conversations with

the patient must take place prior to their application to ensure the patient is fully informed and consents to treatment.

Figure 5



Mechanical

Mechanical debridement refers to the physical removal of devitalised tissue, historically this was associated with the use of 'wet to dry' gauze where the top of the wound was effectively ripped from the underlying structure, this non-discriminatory method resulted in damage to the healthy tissue and significant pain for the patient so has not been used for many decades within the UK. However, in recent years mechanical debridement is on the rise with the use of monofilament debridement pads (Debrisoft). Debrisoft is a single use, soft, polyester fibre pad which is wiped across the wound in either circular or vertical motions (depending on tissue type), dead cells and wound debris are caught within the fibres and removed from the wound bed, (Atkin, 2014). The advantages of debridement using Debrisoft is that is it easy to perform, requires little training, it is a fast effective method which causes no damage to the healthy underlying or surrounding tissue. Debrisoft has recently been

included in a technology appraisal conducted by the National Institute for Health and Care Excellence (NICE), (NICE, 2014). After reviewing the published evidence NICE supported the use of Debrisoft as an effective method of wound debridement which additionally could reduce costs of patient care in the community setting. NICE calculated that Debrisoft could save the National Health Service up to £484 per patient of completed debridement episode compared to standard practice, (NICE, 2014). However, effectiveness is dependent on tissue type; debridement with monofilament pads is not effective on dry eschar, hard necrotic tissue or thick dehydrated slough.

Sharp Debridement

Sharp debridement involves the removal of dead tissue with a scalpel, pair of scissors or forceps, in many cases the level of debridement is just above the level of viable tissue. Sharp debridement can only be performed by practitioners who have undergone appropriate training and who are able to prove competency in this area. In experienced hands sharp debridement is a fast, selective and effective means to remove de-vitalised tissue which it is often pain free for the patient.

Surgical debridement

Surgical debridement is the fastest and usually the most thorough method available, (Stephen-Haynes & Thompson, 2007). It is usually performed in an operating theatre and involves an anaesthetist and a surgical practitioner resulting in this being a high cost option. In many instances it results in a larger wound being created as surgical debridement is not as selective as some other methods, and frequently an element of viable tissue is also removed. Due to these issues surgical debridement tends to be reserved for patients with extensive tissue damage or those facing risk from increasing virulent infection such as diabetic foot ulceration or necrotising fasciitis.

Conclusion

Debridement is an integral part of wound management, the aim of debridement is to remove non-viable tissue allowing wound healing to occur. Many different methods of debridement are available each with their own specific advantages and disadvantages. Nurses based in community settings continue to provide the majority of wound care to patients, in order to deliver high quality care they need to be confident that they posess the required knowledge and skills to accurate assess the wound, to formulate appropriate aims of care and to select the most applicable method of debridement. Failure to select the most appropriate method of debridement may lead to delays in wound healing, increased costs and unnecessary patient suffering.

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