

PERFORMING A WOUND SWAB GUIDELINE


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1.0 Introduction

The efficient and effective assessment and diagnose of wound infection is necessary to inform the appropriate management of the wound. A wound swab is performed to isolate and identify micro-organisms in a wound, and to determine the antibiotic sensitivity of those micro-organisms (Bryant and Nix 2016). This guideline is intended to guide nursing practice in relation to the performing a wound swab on children attending OLCHC.

2.0 Definition of Guidelines

These Guidelines on Performing a Wound Swab represent the written instructions about how to ensure high quality care is provided. Guidelines must be accurate, up to date, evidence-based, easy to understand, non-ambiguous and emphasise safety. When followed they should lead to the required standards of performance.

3.0 Definitions / Terms

Biofilm

A structured community of microbes with genetic diversity and variable gene expression (phenotype) that creates behaviours and defences used to produce unique infections (chronic infection). Biofilms create a wound environment which is characterised by significant tolerance to antibiotics and biocides while remaining protected from host immunity. (IWII 2016)

Inflammation

Initial response to tissue invasion or injury. Results in a defensive reaction to tissue injury with increased blood flow and capillary permeability and facilitates physiologic cleanup of the wound; accompanied by increased heat, redness, swelling and pain in the affected area. (Bryant and Nix 2016)


Wound

A cut or break in the continuity of the skin caused by injury or surgical procedure

Wound Infection

Invasion of a wound by proliferating micro-organisms that invokes a local and/or systemic response in the host (IWII 2016). The development of a wound infection is dependent on the virulence of the micro-organisms and the immune-competency of the host. The IWII have defined a *Wound Infection Continuum* which reflects the five defined stages or impacts that micro-organisms have on wounds (2016) (See also *Section 6 of this document*).

- Contamination:** Presence of non-proliferating micro-organisms in a wound at a level which does not provoke a response by the host. (International Wound Infection Institute (IWII) 2016)
- Colonisation:** Micro-organisms present in a wound with limited proliferation but without eliciting symptoms or a reaction by the host (IWII 2016).
- Local Infection:** When micro-organisms move deeper into the wound tissue and proliferate at a rate which provokes a host response. Local infection is contained in one location, system or structure. (IWII 2016)
- Spreading infection:** This refers to the invasion of the surrounding tissue by infective micro-organisms which proliferate to the extent that signs and symptoms extend beyond the wound border (IWII).

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- e) **Systemic Infection:** Affects the whole body with infection spreading via the vascular or lymphatic systems, and signs of systemic infection are systemic inflammatory response, sepsis and organ dysfunction (IWII 2016)

4.0 Applicable to

These guidelines are applicable to all nurses who are involved in performing a wound swab.

5.0 Objectives of the Guideline

The purpose of the guidelines is to promote safe, effective and consistent practice in relation to when, why and how a wound swab should be performed

6.0 Guideline

There is considerable debate in the literature, about the optimum method of determining bacterial presence in a wound. Tissue biopsy is associated with a high degree of sensitivity and accuracy (Copeland-Halperin et al. 2016). However, it is not always reasonably practicable to perform a biopsy, especially in paediatrics. Wound swabbing is widely used, cost-effective and minimally invasive, but it is associated with varying techniques which may affect its efficacy (Copeland-Halperin et al. 2016).

6.1 Indications for a wound swab

Wound swabbing should not be done routinely or without rationale (IWII 2016). To avoid unnecessary swabbing, nurses should exercise clinical judgement prior to taking a wound swab, to determine:

- 1) Why is this swab being taken?
- 2) What does one wish to find out from this swab?

The IWII (2016) have identified indications for collecting a wound specimen:

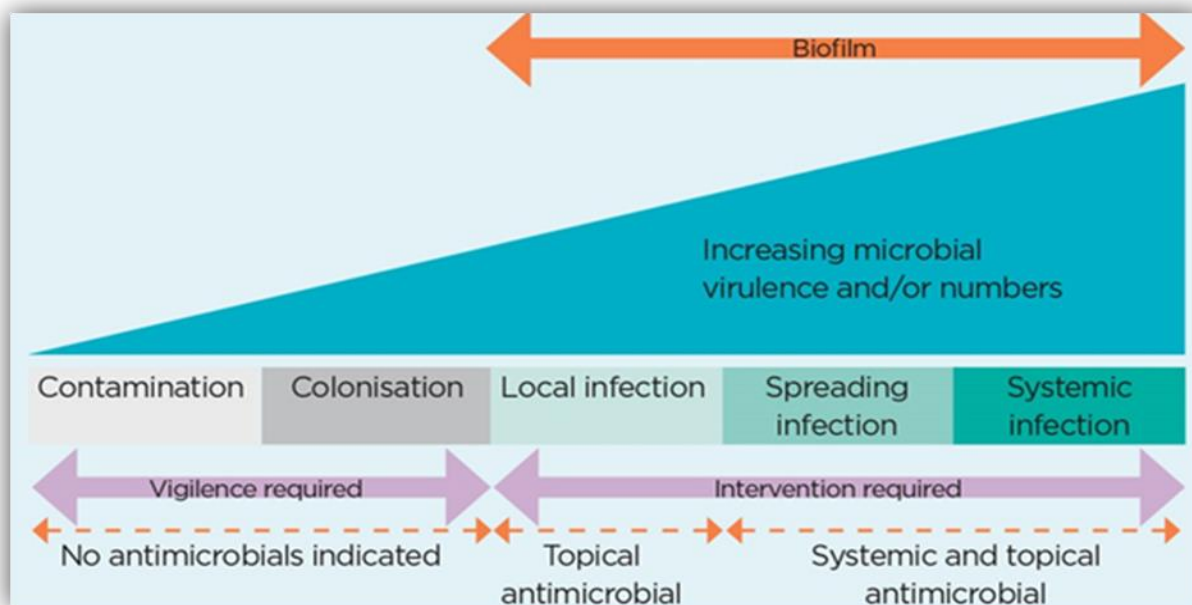
- Acute wound with classic signs and symptoms of infection
- Chronic wounds with spreading or systemic infection
- Infected wounds which fail to respond to antimicrobials or deteriorate even with appropriate antimicrobials
- In line with local protocols for surveillance of drug resistant micro-organisms
- Wounds where the presence of certain micro-organisms would contraindicate a specific course of treatment, e.g. beta haemolytic streptococcus in a wound prior to skin grafting.

6.2 Clinical Signs of Wound Infection and the Wound Infection Continuum

Microbiological assessment alone may not diagnose a wound infection, as a wound may be colonised with bacteria which does not adversely affect healing (IWII 2016). A comprehensive assessment of both the child and the wound for signs and symptoms of a wound infection must also be conducted (Bryant and Nix 2016, IWII 2016).

The IWII (2016) have defined a *Wound Infection Continuum* which reflects the five defined stages or effects that micro-organisms have on wounds and the clinical presentation of these (Figure 1 overleaf).

Figure 1: Wound Infection Continuum (IWII 2016, pg. 7)



SIGNS AND SYMPTOMS ASSOCIATED WITH STAGES OF THE WOUND INFECTION CONTINUUM	
Contamination	All wounds may acquire micro-organisms. If suitable nutritive and physical conditions are not available, or micro-organisms are not able to overcome host defences, they will multiply or persist; their presence is therefore only transient and wound healing is not delayed
Colonisation	Microbial species successfully grow and divide, but do not cause damage to the host or initiate wound infection
Local infection	<p>Covert (subtle) signs of local infection:</p> <ul style="list-style-type: none"> • Hypergranulation (excessive 'vascular' tissue) • Bleeding, friable granulation • Epithelial bridging and pocketing in granulation tissue • Wound breakdown and enlargement • Delayed wound healing beyond expectations • New or increasing pain • Increasing malodour <p>Overt (classic) signs of local infection:</p> <ul style="list-style-type: none"> • Erythema • Local warmth • Swelling • Purulent discharge • Delayed wound healing beyond expectations • New or increasing pain • Increasing malodour
Spreading infection	<ul style="list-style-type: none"> • Extending in duration +/- erythema • Lymphangitis • Crepitus • Wound breakdown/dehiscence with or without satellite lesions

	<ul style="list-style-type: none"> • Malaise/lethargy or nonspecific general deterioration • Loss of appetite • Inflammation, swelling of lymph glands
Systemic infection	<ul style="list-style-type: none"> • Severe sepsis • Septic shock • Organ failure • Death

6.3 Wound Swabbing technique


There is some debate in the literature as to the most effective method of swabbing the wound. Two techniques have been described (**Table 1**).

Table 1: Techniques for performing a wound swab


Technique	Description	Comment
Levine's method Levine 1976	<ul style="list-style-type: none"> • Rotate the swab over a 1cm² area of the wound, applying sufficient pressure to express fluid from the wound bed. • Repeat in other parts of the wound if needed 	<ul style="list-style-type: none"> • Identified as superior to the Z-Technique for culturing a wound <i>Copeland-Halperin et al. 2016</i> • <i>May be uncomfortable for the patient to tolerate downward pressure on the wound</i>
Z-Technique	<ul style="list-style-type: none"> • Move the swab in a zig-zag motion across the wound, while rotating the swab between the fingers. 	<ul style="list-style-type: none"> • Less sensitive than Levine method. May be more tolerable for the patient but there is a risk of contamination when swabbing a larger area <i>Bonham 2009</i>

6.4 Guidelines on performing a wound swab

ACTION	RATIONALE & REFERENCE
Assess the child's level of pain and administer appropriate analgesia.	To reduce the pain associated with the procedure, thus increasing the child's comfort <i>Nilsson & Renning 2012</i>
Assess wound for evidence of healing or infection.	Careful wound assessment can help to identify if infection is present <i>IWII 2016</i>
Decontaminate hands with appropriate solution	To prevent cross infection <i>OLCHC 2017</i>
Use appropriate ANTT level depending on the nature and extent of the wound.	To prevent contamination of the wound and swab <i>OLCHC 2017</i>
<p>Preparation of the wound</p> <p>Before taking a wound swab, gently cleanse wound with water, either by irrigating or using sterile gauze.</p> <p>Do not use an antimicrobial cleansing solution as this may result in a false negative result</p>	<p>Cleansing the wound prior to swabbing:</p> <ul style="list-style-type: none"> • Reduce contamination of swab from exudate • Removal of topical gels, etc which may have been used on the wound (<i>IWII 2016</i>) • Ensures accurate collection of organisms from wound <i>Bonham 2009, Cooper 2010</i>

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<p>If wound surface is wet, use a dry swab.</p> <p>If wound surface is dry, slightly moisten the swab with sterile water.</p>	<p>This allows for maximum collection of micro-organisms from the wound bed <i>Bonham 2009, IWII 2016</i></p>
<p>Swabbing Technique</p> <p>Consider which technique is most suited to the clinical situation. (See 6.4 above)</p> <p>A) Levine Method: In a large wound it may be more appropriate to sample selected parts of the wound.</p> <p>Identify a 1cm² section of an area of infection, extension of wound, or cellulitis.</p> <p>Apply gentle downward pressure on the wound with the swab to release exudate.</p>	<p>More effective than Z-technique, and avoids the risk of contamination which may occur when swabbing a larger area using the Z-Technique.</p> <p>To permit accurate interpretation of results, only swab areas of suspected infection in a large wound <i>Levine 1976, Bonham 2009</i></p> <p>To give an accurate picture of the presence of bacteria within wound <i>Levine 1976, Bonham 2009</i></p>
<p>B) Z-Technique: Use a zig-zag motion to draw the swab across the wound surface, while rotating the swab gently between fingers</p>	<p>May be more tolerable to the Levine Method.</p>
<p>C) Abscess / Deep wound:</p> <p>Ideally aspirate pus from the deepest portion of the lesion using a syringe. Place pus in sterile screw-cap container.</p> <p>If aspiration of pus is not possible or there is insufficient pus to collect in a sterile container, swab the deepest part of the lesion using a black transport swab.</p> <p>Ensure superficial areas of wound have been cleaned.</p>	<p>To ensure detection of bacteria within the wound and to avoid obtaining a sample of superficial flora <i>IWII 2016, Public Health England 2016, OLCHC 2018</i></p> <p>To avoid inaccurate results <i>OLCHC 2018</i></p> <p>To prevent contamination of the swab by the wound surface <i>Public Health England 2016, OLCHC 2018</i></p>
<p>Documentation</p> <p>Label swab with patient details, anatomical site of the wound, date and clinical area.</p> <p>Patient label can be applied, or patient details can be written, on to swab in advance of the procedure. If taking several swabs, do not label the site of the swab beforehand, as this may lead to misidentification of the wound.</p>	<p>To maintain accurate documentation <i>Nursing & Midwifery Board of Ireland (NMBI) 2015</i></p>
<p>Label microbiology form with clinical details, i.e.</p> <ul style="list-style-type: none"> • Clinical specialty, e.g. Burns, Oncology, • Anatomical site of the wound • Clinical indicators for performing swab • If wound is deep or superficial • If the wound is a post-operative surgical 	<p>Recording the site of the wound swab is important as organisms which may be normal flora in one part of the body can be pathogenic in another part</p> <p>Providing the microbiologist with patient's clinical information permits</p>

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wound, and if so, how many days post-op <ul style="list-style-type: none"> • If the patient is immuno-compromised • Any other clinically relevant information Send swab to laboratory in a timely manner for analysis.	a) holistic interpretation of the results and b) epidemiological data in relation to causative organisms of infections in the patient population <i>IWII 2016, Public Health England 2016, OLCHC 2012 – Check date of most recent lab handbook</i>
If appropriate, re-dress wound as clinically indicated. Ensure the child is comfortable after procedure, and administer additional pain relief if necessary.	To support healing, prevent contamination and promote comfort Bryant and Nix 2016. To reduce the pain and anxiety associated with the procedure, thus increasing the child's comfort Nilsson and Renning 2012

7.0 Special Considerations

See section 6.4 above

8.0 Companion Documents

OLCHC (2018) (or most recent version) *Laboratory Users Handbook: Microbiology — Notes on specimen collection technique*. OLCHC, Dublin. <http://olchlab.return2sender.ie/Account/Login.aspx>

OLCHC (2017) *Aseptic Non-Touch Technique Reference Guide*. OLCHC, Dublin

9.0 Implementation Plan

Communication and Dissemination

- Guidelines will be posted on hospital Intranet and Internet
- Email will be circulated to all staff informing them of issue of guideline

Training

- Education and training will be delivered at departmental level using existing educational resources, e.g. Clinical Nurse Facilitators
- Education is included in induction packages for relevant clinical areas / staff

10.0 Monitoring and / or Audit


Evaluation and Audit includes:

- Data in relation to wound infection in specific services, e.g. Surgical, Orthopaedics, Burns
- If trends in wound infection are noticed, e.g. causative organism, the Microbiology Dept will liaise with relevant teams / disciplines
- Feedback from nursing staff on the guidelines to contribute to ongoing guideline development

11.0 References

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