Assessment and management of patients with minor traumatic wounds

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None declared

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Abstract
Patients with minor traumatic wounds are a common and universal presentation to emergency departments, and their assessment and management requires the use of cognitive and motor skills. Knowledge of anatomy and physiology, combined with decision-making skills, are essential for clinicians to undertake a thorough assessment, develop a care plan and provide effective wound management. This article discusses the importance of wound irrigation and debridement, as well as different methods available for wound closure. It is important that clinicians are competent in the motor skills required to perform these tasks to enable effective care delivery. Nurses should be aware of the latest research in the field and implement best practice in their clinical settings.

Keywords
debriefment, minor traumatic wounds, surgical glue, surgical staples, suturing, wound care, wound management

Aims and intended learning outcomes
This article provides an overview of the physiology and terminology of minor traumatic wounds, as well as exploring the current techniques in delivering care to patients with these wounds. After reading this article and completing the time out activities you should be able to:
» Provide definitions of the terms used in relation to wounds and wound management.
» Understand that structures remote from the wound site can be affected by traumatic wounds and include an examination of these structures as part of the patient assessment.
» Describe the variety and use of anaesthetic agents in providing pain relief for wounds.
» Understand the techniques used in wound irrigation, debridement and wound closure.
» Outline the benefits of the different methods of wound closure, and be able to select an appropriate method for each wound presentation.

Introduction
The incidence of traumatic wounds in patients presenting to an emergency department is thought to be significant, although this is difficult to quantify. In the UK, there is a lack of information pertaining to population-based rates of injury, and the incidence of minor traumatic injury is unknown (Alexandrescu et al 2009). However, Singer et al (2006) estimated that 90 million lacerations were presented to emergency departments in the US between 1992 and 2002. Traumatic wounds represent a substantial cost to the healthcare sector in terms of staff and equipment resources, while implications for patients include pain, functional loss and associated financial strain. The effect of nursing care for these patients cannot be underestimated. First aid and the delivery of definitive treatment, along with aftercare, all have an effect on patient outcomes and satisfaction.
**Terminology**

The term ‘wound’ can refer to any break in the continuity of the skin; however, the term does not describe the injury in any specific manner. Non-traumatic wounds tend to be caused by internal factors, such as diabetes or venous insufficiency, whereas traumatic wounds are caused by external forces. Surgical wounds are categorised as traumatic wounds, but since they result from a deliberate and controlled force, they cause minimal tissue damage. With the exception of abrasions, which are superficial in nature, traumatic wounds tend to be either lacerations or incisions. Lacerations are caused when trauma exceeds intrinsic tissue strength and the skin tears due to blunt force (Leaper 2006). Incised wounds are caused by the force of sharp-edged objects, such as knives, sheet metal or glass. These wounds tend to be linear in appearance but the depth can be uncertain. Other traumatic wounds can be caused by burn injuries or animal or human bites. The principles of assessment and infection control are the same regardless of the type of wound, but the definitive treatment differs, and is therefore beyond the scope of this article.

**Physiology**

The skin is the largest organ of the body and has many functions. Wickett and Visscher (2006) defined these functions to include the skin’s ability to regulate body temperature, receive external stimuli and aid the synthesis of vitamin D. The uppermost layer of the skin is the epidermis and is itself made up of several strata (Figure 1). The epidermis has rapid mitotic activity that enables rapid healing (Strecker-McGraw et al 2007) and the uppermost strata – the stratum corneum – is composed of keratinocytes and acts as protection against injury, microbial invasion and desiccation (Hussey and Bagg 2011). Below the epidermis is the dermal layer, the site of thermoregulation.
It is important to ascertain the exact mechanism of the injury because this can give an indication of the extent of the damage. Some wounds will be relatively clean, for example from a clean knife, whereas others will be contaminated to varying degrees. This contamination can cause a multiplication in the bacterial load so it is important to document the time and date of injury.

**TIME OUT 1**

Review the anatomy and physiology of the skin and its associated structures. Write brief notes on how damage to different layers of skin might affect normal functioning.

The healing process can be divided into three distinct phases: inflammation, proliferation and remodelling. Hermans (2010) included a fourth phase – haemostasis (the physiological process by which bleeding is controlled) – which precedes the other three phases. Hermans (2010) also observed that some wounds may skip some of these sequential steps as a result of intervention, for example when a sutured wound does not develop a visible granulating surface, or when excision and grafting of a full-thickness burn avoids granulation and accelerates healing. A granulating surface is an area of growth of new connective tissue; because of the number of new blood vessels, the tissue appears pink and can have small protuberances that look like grains, hence the term granulating. Other authors include haemostasis in the inflammation phase (Armitage and Lockwood 2011, Hussey and Bagg 2011), which begins the moment that the injury occurs and can last 2-5 days. The inflammation phase begins with platelet aggregation and the formation of a fibrin clot that forms an extracellular matrix. The proliferation phase follows, during which cells migrate from the edge of the wound through the extracellular matrix, enabling granulation and re-epithelialisation. This phase can last up to 3-4 weeks and is followed by the remodelling phase, during which new collagen is laid down over a period of several months and the tensile strength of the wound gradually increases.

**Clinical evaluation**

Minor traumatic wounds can occur during many activities in the home or workplace, with some occupations at higher risk than others, for example the poultry processing and meatpacking industries (Kyeremateng-Amoah et al 2014). It is important to ascertain the exact mechanism of the injury because this can give an indication of the extent of the damage. Some wounds will be relatively clean, for example from a clean knife, whereas others will be contaminated to varying degrees. This contamination can cause a multiplication in the bacterial load so it is important to document the time and date of injury. Following this, it is necessary for the clinician to conduct a clinical evaluation of the patient in general and the wound in particular.

Factors that can increase the risk of infection and impair wound healing include increased age, chronic renal failure, diabetes mellitus, obesity, malnutrition and the use of immunosuppressive drugs, for example corticosteroids and chemotherapy (Singer et al 1997). Enquiries should be made as to whether the patient has any allergies, since some wounds might require antibiotic treatment and some patients might be sensitive to latex or sticking plaster. Nicotine in cigarettes causes constriction of the visceral muscle surrounding blood vessels, which reduces blood supply and will therefore adversely affect healing times (Barua et al 2002).

The patient’s tetanus immunisation status should be established. In the UK, the childhood vaccination programme consists of the administration of five doses of tetanus vaccine at appropriate intervals, which is considered to give satisfactory long-term protection of up to 10 years (Public Health England 2013). An injection of tetanus toxoid should be given if the patient has not had cover in the past 10 years and, if the wound is particularly contaminated, tetanus immunoglobulin
should also be administered (World Health Organization 2010). As part of holistic assessment, the patient’s social and domestic circumstances should be reviewed to identify any effects that the wound and subsequent treatment will have on independent functioning. The degree to which the patient is experiencing pain or anxiety should also be noted. Pain from the wound can distract from other injuries and a patient who is anxious might not assist in the examination process.

TIME OUT 2
Explore the pathological reasons for compromised wound healing as a result of diabetes. Discuss with a colleague the effects this may have on patient care.

TIME OUT 3
A patient presents with a tetanus-prone wound. He is unsure of his vaccination status. However, he has a needle phobia and is adamant that he does not want an injection. List any other treatment options that could be used in this situation?

Once an overall health assessment has been completed, the clinician can then assess the injury. It is necessary to ensure that a good light source is available and the patient is positioned comfortably before the wound is examined. Traumatic wounds, by their nature, are not sterile and a study by Perelman et al (2004) found that there was no clinically important difference in infection rates after using clean non-sterile gloves or sterile gloves during the repair of simple traumatic wounds. Active bleeding can hinder the examination of the wound, so pressure should be applied to reduce or stem blood flow. Elevation of the affected limb can also be helpful in reducing bleeding; however, in some cases the use of a ligature may be necessary. This may involve the insertion of an absorbable suture to pinch closed the open end of the bleeding vessel or the application of a temporary tourniquet. Data suggest that there is no significant risk of complications from tourniquet use in typical orthopaedic surgery in procedures taking less than 2 hours (Fitzgibbons et al 2012). However, best practice is to use a tourniquet that is not too narrow and not tighter than is necessary to achieve a bloodless field, and then to document the duration of its use.

Knowledge of surface anatomy and underlying structures is particularly important because it enables the clinician to focus on the potential for injury away from the immediate vicinity of the wound. For injury of the limbs in particular, it is important to assess the function of the nerves, tendons and circulation distal to the wound. The assessment of nerve sensation and motor function should be conducted before administration of local anaesthetic and the findings should be documented clearly. Based on the initial history, care should be taken to observe for foreign bodies or identifiable contaminants that will need to be removed during the treatment phase. To assess for the risk of a foreign body, radiological tests should be performed. Radiopaque objects will show up on an X-ray, whereas wood and other organic materials may require visualisation with ultrasound. On removal of a foreign body, a comparison X-ray should be obtained to ensure that there is no remnant left in the wound.

Therapeutic intervention
Pain relief
A traumatic wound is a painful experience for the patient, and for a thorough clean, debridement and closure of the wound, a local anaesthetic needs to be administered. A choice of agents is available. One commonly used agent is 1% lidocaine hydrochloride, which takes effect within a few minutes and has a half life of approximately 1.5 to 2 hours.
Although given for the purposes of alleviating pain, the process of administering the anaesthetic agent can be uncomfortable for the patient. There are several steps that the clinician can take to minimise this discomfort. Lidocaine should not be stored in a refrigerator, since it is more tolerable when administered at body temperature than at lower temperatures. The needle should be advanced through the wound margin rather than through intact skin, and advancing the needle to the hub and only injecting small amounts as the needle is withdrawn further lessens discomfort. Informing the patient that they may experience discomfort can minimise sudden patient movements, which reduces the risk of needlestick injury to the clinician. Depending on the location of the wound, infiltration of local anaesthetic at the site may compromise the examination and closure. The most common sites where this occurs are the lips or digits where the volume of the anaesthetic distorts the anatomical landmarks, making it difficult to appose the wound margins. In these locations, a nerve block proximal to the wound should be considered, and this again requires the clinician to have knowledge and understanding of the relevant anatomy.

**Irrigation**

After administering local anaesthetic, the clinician can proceed to irrigate the wound. Copious amounts of irrigation fluid should be used to ensure that all debris is washed out of the wound. Care should be taken when irrigating the wound that sufficient pressure is used to dislodge particulate matter, but not so much pressure as to drive that matter deeper in the wound or cause further damage to already traumatised tissue. Copious amounts of irrigation fluid should be used to ensure that all debris is washed out of the wound. Care should be taken when irrigating the wound that sufficient pressure is used to dislodge particulate matter, but not so much pressure as to drive that matter deeper in the wound or cause further damage to already traumatised tissue. If the wound depth is relatively superficial, low pressure irrigation from a bulb syringe is usually sufficient, and this will give a pressure of 0.5psi. High pressure irrigation of 7psi can be achieved by using a 19-gauge needle on a 35mL syringe and is effective in reducing bacterial load in the wound by 80% (Edlich et al 2010). Irrigation can also present risks to the clinician because of overflow and ‘splashback’. Universal precautions for clinical staff, such as wearing personal protective equipment, and the use of an irrigation splash guard on the syringe can reduce this risk. In the absence of a splash guard, gauze can be wrapped around the needle or the clinician can syringe between the web-space of their thumb and index finger.

There is some debate regarding the most appropriate fluid for wound irrigation. In a clinical setting, 0.9% sodium chloride is the most commonly used irrigation fluid because it is isotonic and does not compromise the healing process. However, in the community or other settings where saline is not readily available, tap water can be used. A Cochrane review by Fernandez and Griffiths (2012) found that there was no statistical difference between the use of saline and tap water in studies that compared rates of infection. These findings were supported by the authors of small prospective double-blind randomised controlled clinical trials (Fernandez et al 2004, Weiss et al 2013), who found no difference in infection rates. The authors advocated that tap water should be used for traumatic wound irrigation in emergency departments, because it is easily accessible, efficient and cost-effective.

There is greater controversy regarding the use of other irrigation agents such as povidone iodine, hydrogen peroxide and chlorhexidine solutions. A review of the literature identifies several articles in which the authors advocate against the use of antiseptics in open wounds, citing cytotoxicity data (Rodeheaver 1989, Atiyeh et al 2009, Hussey and Bagg 2011). However, Gravett et al (1987) reported reduced incidence of wound infection after scrubbing with povidone iodine compared with saline irrigation. Khan and Naqvi (2006) suggested that, with the emergence of antibiotic resistance, there has been a reappraisal of the use of povidone iodine in the management of contaminated and infected wounds.

**TIME OUT 4**

Review your organisation’s policy on the use of sterile gloves and saline in acute wound management, and explore the cost and resource implications.
Debridement
Debridement is the removal of lacerated, devitalised or contaminated tissue, and its importance cannot be overstated. Traditionally, traumatic wounds presenting to an emergency department that were older than 6 hours were managed by delayed closure or secondary healing – the wounds were not sutured. This approach was based on the animal studies of Friedrich (1898), who postulated that wounds older than 6 hours were at a higher risk of infection than those managed in a timelier manner. In a prospective study of 425 patients, van den Baar et al (2010) reported that 3 out of 45 wounds that were closed outside the 6-hour window developed an infection, compared with 30 out of 363 wounds closed within the 6-hour window ($P = 0.59$), thus supporting the closure of wounds irrespective of time since injury. However, the authors acknowledged that ‘depending on the amount of contamination, wounds were disinfected and debrided before they were sutured’. This statement appears to suggest that debridement or the removal of devitalised tissue and debris from within the wound was essential to minimise further harm. Although this was a relatively small study, a review by Steen (2014) of five other studies corroborated this finding, but cautioned that it is necessary to carry out further robust research.

As mentioned in the previous section, irrigation is important in removing debris from the wound. Additional tools necessary for debridement include a scalpel and fine-toothed forceps, and it is important for the clinician to be competent in their use. Hair can act as a contaminant and should be either clipped or smoothed away from the wound margins using a lubricant; shaving should be avoided because it has the potential to damage the skin and cause infection (Cowperthwaite and Holm 2015). Devitalised or necrotic tissue should be excised – it is recommended that if the tissue does not bleed, then it risks compromising the wound by acting as an anaerobic culture medium, promoting bacterial growth and inhibiting phagocytosis (Edlich et al 2010). As little tissue as possible should be removed in the first instance. Some tissues, such as tendon and bone, do not bleed and will require a formal surgical opinion (Hussey and Bagg 2011).

Methods of wound closure
There are several methods available to clinicians for closing a wound. The method used depends on the characteristics of the wound, including its size, depth, location and how quickly it is expected to heal. Hollander and Singer (1999) summarised the ideal wound closure technique as one that: enables meticulous wound closure; can be easily and rapidly applied; is low risk to the clinician; is painless and inexpensive; and results in minimal scarring with a low infection rate. No single technique meets all of these criteria, and each wound must be assessed individually.

Sutures
Wound suturing was documented in ancient Assyria and Egypt about 4,000 years ago (Ali and Johna 2015). Although the concept of suturing has survived through the millennia, the techniques and materials have changed substantially. Suture materials made from silk or catgut are no longer advocated because they can cause excessive tissue reactions that can lead to infection and scarring. Modern suture materials are synthetic, either absorbable or non-absorbable, and come either as monofilaments or in braided form. The shape, length and cutting edge of the needle can also vary depending on the suturing task. When closing deep wounds, the clinician should consider the support that the suture material gives to the healing tissue, so tensile strength is important. Polyglactin and polyglycolic acid sutures have been developed to give support for up to 28 days, whereas in other suture materials, such as polydioxanone and polyglyconate, 50% of tensile strength of the original material remains for up to 2 months (Greenberg and Clark 2009). Buried sutures reduce skin tension, decrease dead space and reduce the risk of
haematoma formation. Superficial sutures should evert the wound margins to enable functional closure with a minimal cosmetic scar.

Although it is a versatile closure method, suturing has some limitations. Suturing is a motor skill and therefore needs to be learned and practised. It can be an expensive method of wound closure, once the materials required and the clinician’s time is taken into consideration, also the risk of a needlestick injury cannot be excluded. Anaesthesia is required and non-absorbable sutures require removal after a period of time.

Surgical staples
Surgical staples are a common method of wound closure, although they are only suitable for closing the superficial layers of skin. They are quick to insert and acquiring the skill of inserting them requires less time. Depending on the length of the wound, local anaesthesia might be required, although the clinician is at less risk of needlestick injury from stapling than from suturing. Staples are not as versatile as sutures and are not suitable for some areas of the body, such as the face. The meticulous closure afforded by sutures cannot be replicated by staples; however, Armitage and Lockwood (2011) suggested that because staples do not completely penetrate the skin and do not form a tract between wound edges, there is less risk of infection.

The majority of modern staples are made from stainless steel or titanium. Although this information appears on bulk packs of staples, it is often missing from single wrapped packs. If the traumatic wound is part of a larger injury to the body, the patient might require investigations such as a magnetic resonance imaging (MRI) scan. One manufacturer states that their stainless steel product has a low mass and their composition is considered non-magnetic. In addition, the manufacturer claims that the staples will not vibrate or heat up, although there might be slight image distortion. These claims are based on MRI and nuclear magnetic resonance procedures with static magnetic fields of 3.0 Tesla or less (Covidien 2016). Nevertheless, it would be appropriate to discuss this method of closure with an investigating radiologist before any imaging procedure is carried out. As with non-absorbable sutures, staples will require removal and this again has associated time and resource implications for the patient and the healthcare provider.

Surgical glue
Surgical glue has had a significant effect on wound closure techniques since it was first introduced in the 1960s, particularly in paediatric settings, where it is an effective needle-free option for managing traumatic wounds in emergency department presentations (Mattick 2002, Singer et al 2010). Surgical glue is quick to apply and provides good cosmetic outcomes (Al-Mubarak and Al-Habbab 2013). However, it has some drawbacks. For example, wound margins need to be apposable and dry; while this is manageable for surgical wounds, it can be difficult to achieve in other types of traumatic wound. Until recently, tissue adhesives were contraindicated in the management of wounds that involved mucosal tissue or any structure below the dermis. However, advances in this area have led to the development of a urethane-based glue, which has been licensed in the US and Europe for closure of tissues in abdominoplasty (Cohera Medical 2016).

When compared with sutures and staples, tissue adhesive is a relatively painless option. However, the polymerisation reaction that occurs as the glue bonds causes a thermal reaction that some patients might find uncomfortable. In a study of 221 children, Harman et al (2013) reported that the application of topical lidocaine-epinephrine(adrenaline)-tetracaine was more effective than placebo in reducing this discomfort. In the absence of an intradermal anaesthetic, there is a risk of inadequate wound toilet (wound irrigation and debridement) and examination, thereby compromising healing and cosmetic appearance.
A common use for tissue adhesive is in scalp wounds where, unlike sutures or staples, removal is not required. The hair apposition technique (HAT) uses tissue adhesive to bind two braids of hair from opposite sides of a wound to appose the wound edges and reduce tension on the wound. In a retrospective study, Ozturk et al (2013) reported better patient satisfaction rates and fewer cosmetic complications with the use of HAT compared with suturing or stapling. Use of HAT has been documented since the beginning of the 21st century (Hock et al 2002), yet it appears to be contrary to the product information leaflets of two commonly used tissue adhesives. In the contraindications for Dermabond ProPen skin adhesive, a 2-octyl-cyanoacrylate, it is stated that the product should not be used in areas where it ‘may be regularly exposed to body fluids or with dense natural hair (for example, the scalp)’ (Ethicon 2016). The product information for another cyanoacrylate glue, LiquiBand flow control tissue adhesive, states that the adhesive can be safely used on the scalp area, but the EU data product sheet states that it should not be used in conjunction with hair weaving techniques (Advanced Medical Solutions 2016).

It is important to note that, despite the obvious advantages of tissue adhesives, they have some limitations and should be considered as one of the tools that may be required in wound management.

**Adhesive tape**
The use of adhesive tape in a wound setting was first described by the French surgeon Ambroise Paré in the 1500s (Armitage and Lockwood 2011). Modern adhesive tapes are made of porous paper strips or synthetic polyamide material similar to nylon. These tapes are applied in a parallel, non-overlapping fashion and usually require the use of an adjunct adhesive to aid fixation. In a small study of volunteers, the use of tincture of sodium benzoate (Friars Balsam) increased the adhesiveness of tape seven-fold, whereas a two-fold increase in tape adhesiveness was noted using a transparent film dressing spray (Sarifakioglu and Sarifakioglu 2006). These findings demonstrate one of the main problems with adhesive tapes: they work well as part of a treatment regimen rather than being the main component.

Adhesive tapes cannot be used for wounds under tension or when the surrounding tissue is moist. It is difficult to ensure wound margin apposition and skin edge eversion with the use of adhesive tape (Kolt 2003, Al-Mubarak and Al-Habbab 2013). Once an adjunct has been used, such as deep dermal sutures or topical adhesive, a skilled clinician can use adhesive tape to help achieve a good cosmetic outcome. This is partly because the incidence of infection of contaminated wounds closed by sutures is significantly greater than the infection rate of taped wounds (Edlich et al 2010). Another factor is the lack of inflammatory tracks that are caused by the reactivity of suture materials.

**TIME OUT 5**
Explore options for maintaining competency in wound-closure techniques. Reflect and make brief notes on how you would document attaining this competency in your professional portfolio.

Each of these methods of wound closure has advantages and disadvantages in managing a traumatic wound. It requires an experienced clinician to determine which individual technique, or combination of techniques, is most appropriate in managing a particular patient’s wound. As well as having good judgement, the clinician must be proficient in the technical and motor skills required to use these methods effectively and to their maximum potential. This can be achieved through experience and practice in a clinical setting with access to senior clinicians for support and mentorship. It is important that research into the latest developments in wound closure is undertaken and that this is complemented by an audit of practice.

**Aftercare**
After wound closure, the patient can be discharged with a prescription for suitable analgesia to provide comfort and pain...
relief. However, the possible addition of an antibiotic to this prescription has been debated (Zehtabchi et al 2012). The overprescribing of antibiotics has led to the development of resistant bacteria (McKenna 2014). Prophylactic antibiotics should not be prescribed for simple traumatic lacerations, since evidence suggests that they are of no benefit (Lane et al 2012). Meticulous irrigation and debridement of a wound should lessen the bacterial load sufficiently to enable the body’s defences to manage potential infection. Where wounds cannot be thoroughly examined and irrigated, such as puncture wounds from bites, then antibiotic cover should be commenced (Simon and Hern 2013). Wounds exposing bone, joints and tendon, or those contaminated with potentially infectious factors such as soil, also require antibiotic cover.

The priority for the clinician is to restore functionality to the injured structure; however, consideration also needs to be given to the cosmetic appearance, particularly because it may be of concern to the patient. Patients will commonly ask how many stitches they will need and whether the wound will leave a scar. There are several factors that will affect the healing potential of a patient, such as age, comorbidities, ethnicity, medications and smoking. However, there are several local measures that can be undertaken to minimise scarring. First, a suitable dressing needs to offer protection until gross infection in a sutured wound. Subsequent dressings should offer a moist, protective environment until sutures or

References


staples need to be removed. Depending on the location of the wound, inflammation from suture sinus tracts can be reduced by removing sutures in a timely manner. Facial sutures should be removed and replaced by adhesive tape between 3–5 days after they are inserted. Upper limb sutures can be removed after around 7 days, with sutures in wounds over an extensor surface remaining in place for 10 days. Lower limb sutures can be left in place for up to 14 days. Patient expectations should be managed by informing them that the maturation of a scar could take up to 18 months.

**Conclusion**

Patients with minor traumatic wounds are a common and universal presentation to emergency departments. Timely and appropriate care can ensure that these patients enjoy a restoration to full function with a reduction in complications such as ongoing pain, discomfort and infection. Clinicians should be confident in performing a holistic assessment and designing appropriate care using their clinical skills and judgement. Although a variety of options for wound closure are available, experience and a sound knowledge base are necessary to choose the most suitable method, along with the motor skills and ability to implement this. Established practices should be revisited and revised in the light of current research and increasing resource costs. Referral pathways to specialty disciplines should be established so that patients whose injuries are more complex than initially thought can be cared for safely. Nurses should continue to provide patient education about wound management to reduce anxiety and increase concordance with aftercare.

**TIME OUT 6**

Now that you have completed the article, you might like to write a reflective account as part of your revalidation


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1. Which is the largest organ of the human body?
   a) Liver
   b) Skin
   c) Gastrointestinal tract
   d) Lungs

2. The uppermost layer of the epidermis is the:
   a) Stratum corneum
   b) Stratum granulosum
   c) Stratum spinosum
   d) Stratum basale

3. Which of the following is classified as a traumatic wound?
   a) Laceration
   b) Burn
   c) Surgical incision
   d) All of the above

4. A granulating surface appears:
   a) Yellow
   b) Pink
   c) Green
   d) Black

5. Which of the following is not a phase in the healing process?
   a) Inflammation
   b) Proliferation
   c) Necrosis
   d) Remodelling

6. During clinical evaluation of a traumatic wound, the patient should be asked about their history of immunisation against:
   a) Haemophilus influenzae
   b) Tetanus
   c) Meningitis C
   d) Rotavirus

7. Surgical staples are not suitable for which part of the body?
   a) The face
   b) The scalp
   c) The hands and fingers
   d) The limbs

8. Which method is particularly effective for closure of paediatric traumatic wounds?
   a) Sutures
   b) Surgical staples
   c) Surgical glue
   d) Adhesive tape

9. Scar maturation can take up to:
   a) 1 month
   b) 6 months
   c) 12 months
   d) 18 months

10. Antibiotics should be prescribed for patients who have:
    a) Bites or puncture wounds
    b) Wounds exposing bone, joints or tendons
    c) Wounds contaminated with likely sources of infection, such as soil
    d) All of the above

How to complete this assessment

This self-assessment questionnaire will help you to test your knowledge. It comprises ten multiple choice questions that are broadly linked to the article starting on page 60. There is one correct answer to each question.

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This self-assessment questionnaire was compiled by Rebecca Akkermans

The answers to this questionnaire will be published on 2 November

Answers to SAQ 864 on Effective therapeutic communication, which appeared in the 5 October issue, are: